# The Chemical Age

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*NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.*

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## Dr. Levinstein's Challenge

DR. HERBERT LEVINSTEIN'S address last week to the Bristol Section of the Society of Chemical Industry on "Chemical inventions, with special reference to chemical patents," constitutes a challenge to some of the fundamental principles on which patents are at present granted. No doubt it will be brought either directly or indirectly to the notice of the Board of Trade Committee appointed to inquire into our patent laws. There are points in it that appeal immediately to the public desire for simplicity and economy in such matters. The chief criticism to which it will be exposed is that it is an impracticable counsel of perfection. The Patent Office experts would probably point out, if they were free to speak, that it would involve such an enlargement of the staff and the functions of the Patent Office as would convert it into something immensely wider and different from what it is to-day.

What is the fundamental feature of Dr. Levinstein's claim? It is that when an inventor has secured a patent for his invention, he should be free to practice it under the protection of his patent without the fear of costly litigation or other risk or trouble. "A patent, once granted, should confer not only a monopoly but the right to exercise that monopoly within the limits of the patent granted." "The time to determine the state of common knowledge is before the grant of a patent, not years later; the place the Patent Office, not the law courts." At first sight, nothing could seem simpler, more sensible, more practical and business-like. Under this scheme the Patent Office staff undertakes all the research into the literature of the particular subject, ascertains whether or not the application has the necessary element of novelty, issues the patent if it does, and then accompanies the grant with an inclusive covering indemnity against all risks in the working of the patent—all for the sum of £5.

The simple answer of the Patent Office would be that the work suggested could not be done for anything like such a fee. To undertake the responsibilities Dr. Levinstein suggests would involve an enormously increased staff, an enlargement of the functions and jurisdiction of the Patent Office, and—unless the cost is to be put on the general taxpayer—a serious increase in expense that would have to be met by considerably increased fees. The present low fee of £5 is presumably intended to make the way of the inventor easy, with the result that applications for patents are numerous; the more costly and difficult the process of obtaining a patent is made, the fewer applicants there will naturally be. The tightening up of the procedure would, no doubt, exclude a number of useless patents, but it would also have the risk of excluding that small percentage of apparently trivial but really valuable inventions for which every facility should be granted. The point is which system is likely to do least harm and most good.

## Who Should Decide?

THERE is one very serious point involved in Dr. Levinstein's case for the rejection of "worthless" patents. It would mean that the Patent Office authorities would have to determine not only whether the invention is novel, but whether it is also important. Who can say, in advance, whether what looks to-day an unimportant invention or improvement may not to-morrow have become one of immense importance? There is, to take an example off-hand, the original Bessemer steel patent. Who, at the first stage, could have foretold that the mere substitution of a hot air blast for a cold air blast would have produced the enormous difference in the quality of the steel that followed? At present the Patent Office has not to pronounce an invention to be important or unimportant. If that responsibility were added to its present duties, we might, with the best intentions, be ruling out some improvement with enormous potentialities that no one could at the moment detect.

On the other hand, our cheaper and easier system of admitting all with a *prima facie* case admits the good, while the bad that are also admitted may generally be trusted to die an early natural death. Again it is a question of securing the least harm and the most good.

Everyone will readily appreciate Dr. Levinstein's point about "blocking" or "bluff" patents, and about the costliness of actions in the Courts, of which there are abundant examples. To a large extent the Patent Office already functions as a law court. The original research, we believe, into the novelty of a claim is confined to British patent specifications; if previous knowledge can be proved by reference to American or German patents or to technical literature, there may be resort successively to the Comptroller, the Law Officers, and the House of Lords. The cases that come into the Courts are usually of a complicated, prolonged, and costly character, and indicate the extreme difficulty of deciding between conflicting expert views. It would be delightful if the Patent Office could say once and for all what applications for patents are good or bad, valuable or useless, genuine or bogus, and could obviate by simple summary decisions the present costly patent litigation. But is it practicable to secure all this without enlarging the Patent service itself into a gigantic legal system, as costly and complicated as that of the Law Courts themselves? Dr. Levinstein has raised some very live and pointed questions for the Patent Act Committee to investigate. And that is as far as one can go at present.

## The Analysis of Sewage

In the past few years a great deal of work has been done, both in this country and abroad, on the treatment and disposal of sewage. In the United States, in particular, much attention has been paid to the subject, as is shown by the numerous papers which have appeared in chemical and other journals. The best testimony to the efficiency of the treatment of sewage in Great Britain is our freedom from the diseases which afflict countries where the control is not so good. The careful eye which is kept on the subject by the powers that be is shown by the report which has just been issued by the Ministry of Health on "Methods of Chemical Analysis as Applied to Sewage and Sewage Effluents."

The report arose from a conference which was held some years ago at the instance of the Ministry, at which various interested parties were represented. This conference appointed a committee to consider improvements in methods of analysis, and the difficulties which beset the subject are shown by the time which has been necessary for the production of the report. Apart from a detailed consideration of methods of testing and the convenient expression of results, the report also goes into the important question of sampling. In view of the different purposes for which samples are drawn, the committee has found itself unable to make specific recommendations, but the opinion is expressed that the methods of gauging and sampling should be stated when reporting. This suggestion, if carried out, should lead to the acquisition of a large mass of important data,

## Research Salaries

The scheme for the establishment of the Canadian National Research Laboratories at Ottawa is now well under way. The general plan of the building to be erected aims, it is stated, at the provision of facilities for an organisation that will combine the functions of the British National Physical Laboratory, the U.S. Bureau of Standards, and the Mellon Institute of Industrial Research, of Pittsburgh. The departments created include those of physics and engineering physics, industrial chemistry, and economic biology. Especial interest attaches to the schedule of salaries for the staff of the organisation, passed by Order-in-Council at the strong recommendation of the Canadian Royal Commission on Salaries for Professional and Technical Men. The figures are as follows (the Canadian exchange rate at the moment being about 4.91 dollars to the £):—

Directors of departments, having the degree of D.Sc. or Ph.D., or an equivalent professional experience of 10 to 15 years, will have the duty of directing and being responsible for all work undertaken in a major department; their salaries will be fixed at $6,500–8,000, with a normal annual increment of $300. Assistant directors of departments (Ph.D., or 10 years' equivalent professional experience), to direct an important division in a department, will receive a salary of $5,400, rising by annual increments of $300 to $6,000; research chemists, physicists, etc. (Ph.D., or 8 years' experience), to be responsible for work on a research problem of minor importance, a salary of $4,400, rising by increments of $200 to $5,200; associate research chemists, etc. (M.Sc., or 5 years' experience), a salary of $3,480, rising by increments of $180 to $4,200; assistant research chemists, etc. (M.Sc., or 2 years' experience), a salary of $2,820, rising by increments of $120 to $3,300; and finally, junior research chemists, etc. (M.Sc.), a salary of $2,100, rising by increments of $120 to $2,700.

### Books Received

The World, the Flesh, and the Devil. By J. D. Bernal. London: Kegan Paul, Trench, Trubner and Co., Ltd. Pp. 96. 2s. 6d.

## The Calendar

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| Oct 13 | Ninth Congress of Chemical Industry. | Barcelona. |
| 14 | Ceramic Society: Pottery Section. Paper by Mr. H. E. Wood on his visit to America. 7.30 p.m. | North Staffordshire Technical College, Stoke-on-Trent. |
| 14 | Institute of Metals (Scottish Section): Chairman's Address. H. H. A. Greer. 7.30 p.m. | 39, Elmbank Crescent Glasgow. |
| 14, 16 & 18 | University of London: "Chemical Forces and Atomic Structure." Professor K. Fajans. 5.30 p.m. | University College, London. |
| 16 | Institute of Chemistry (London Section). | London. |
| 16 | Society of Chemical Industry (Newcastle Section): "Temperature Measurement and Automatic Control." B. A. Robinson. 7.30 p.m. | Chemistry Theatre, Armstrong College, Newcastle. |
| 17 | Chemical Society. 8 p.m. | Burlington House, Piccadilly, London. |
| 18 | Society of Dyers and Colourists (Manchester Section): "The Application of the Locust Beans in the Textile Industry and Especially in the Calico Printing Trade." Dr. Tagliani. 7 p.m. | 36, George Street, Manchester. |

# Rationalisation, with Reference to the Chemical Industry

## Mr. J. Davidson Pratt's Address to the Chemical Engineering Group

*Below is given an account of the main points raised by Mr. J. Davidson Pratt (general manager of the Association of British Chemical Manufacturers) in a paper entitled "Rationalisation, Its Meaning and Application with Special Reference to the Chemical Industry," read before the Chemical Engineering Group on Friday.*

It is difficult to give a simple and at the same time comprehensive definition of rationalisation, but it may be described as the technical, commercial, and financial organisation of an industry in such a manner that the cost of manufacture of the products of the industry can be reduced to the lowest possible level without adversely affecting the conditions of employment of those in the industry. To put it in other words, it is the employment of all methods of technique and organisation in order to increase the productivity of the workers to the highest possible degree, and as a result to improve, increase, and cheapen production. This is the definition which the German Federation of Industries gave in 1925, and, since the conception and application of rationalisation in its present form orginated in Germany, it is important that the German definition should not be overlooked or misconstrued.

The careful and comprehensive definition given by the World Economic Conference held at Geneva in May, 1927, is also well worth studying; rationalisation is understood as "the methods of technique and organisation designed to secure the minimum waste of either effort or material. It includes the scientific organisation of labour, standardisation both of material and products, simplification of processes and improvements in the system of transport and marketing."

### First Adopted in Germany

The ideas of rationalisation were first evolved and adopted as part of the original plan of reconstruction in the basic industries of Germany after the period of inflation and the French occupation. Production had by then been "rationed" among the various works in each industry under the quota arrangements which the old-established syndicates and cartels had brought into operation.

When the new schemes of reconstruction took shape, they were closely associated with the idea of the "rationing" of production, in the minds of the Ruhr industrialists. The result has been that the conception of "rationing" has tended to persist in many people's minds when defining rationalisation, though the latest ideas and principles of this method of industrial reconstruction are now much more comprehensive and far-reaching than the rather limited principle of mere "rationing."

At this stage it appears desirable to consider rationalisation as of two main types, namely, (1) national rationalisation—that is, rationalisation as applied to the industries of any particular country; and (2) international rationalisation, which is an extension of the national ideas into the sphere of international arrangements.

### National Rationalisation

National rationalisation of an industry may be considered under the following main sub-divisions, the extent of the application of which will naturally vary with the industry under consideration:—Standardisation of products; standardisation of processes; arrangements for research and developments; concentration of production; arrangements for purchase and sale; finance; labour policy; general policy and control.

With regard to standardisation of products, many industries suffer from a multiplicity of products which are alike in their main features and uses, but vary in small and quite un-

## An International Group of Chemists

The above photograph represents a group of distinguished American and European chemists who were present at the recent dedication of the new $1,500,000 laboratory at Princeton University, U.S.A., and who received honorary degrees in chemistry. Left to right:—Dean Augustus Trowbridge, of the Princeton Graduate School; Professor F. G. Donnan; Sir James C. Irvine; President J. G. Hibben, of Princeton University; Dr. F. Perrin, representing Jean Baptiste Perrin of the University of Paris; Professor Max Bodenstein, of the Physikalisch-Chemisches Institute of Berlin; Irving Langmuir; and Professor H. S. Taylor.

important points of detail. A drastic elimination of unnecessary designs and the simplification and standardisation of those retained will be a great boon to any industry, since it will enable production to be concentrated on a limited number of products instead of a large number.

In the chemical industry the greatest field for standardisation and reduction in the number of products is the dye industry, and with whole-hearted co-operation the position could be materially improved to the great advantage of both the dye makers and the dye users without any disadvantage to the ultimate consumer of the dyed articles. All schemes of standardisation must, of course, allow for the introduction of new and better products revealed by research.

### Standardisation of Processes

Most industries have several different methods of manufacturing a particular product, varying in their degree of efficiency. A careful examination should enable the most efficient, and by this is meant the cheapest, methods to be selected, and after these have been improved and simplified, where necessary, their adoption in a standardised form should lead to greater economy. This applies equally to the plant and machinery used for the process. The value of such standardisation has already been fully recognised in several countries (especially in the United States and Germany, and to some extent in this country, where the British Engineering Standards Association has done a large amount of valuable work), in spite of the rather lukewarm interest which many branches have taken in it. Standardisation of plant will not only reduce the cost of the plant by enabling it to be made by mass production methods, but will facilitate replacements and repairs, and the conversion of plant from one process to another.

Although standardisation can give valuable results, it must not, however, be carried to excess, otherwise stagnation may ensue. The task of deciding how far standardisation is to go is indeed a difficult one, but it should be possible to find a happy mean. Taking the chemical industry, a limited number of types of plant has been standardised in this country by the British Chemical Plant Manufacturers' Association and the Association of British Chemical Manufacturers working in conjunction, and the problem is being continually watched.

### Research and Development

In an industry consisting of numerous competing units it is inevitable that there should be much overlapping and duplication of effort in the field of research and development, as many of the units will be endeavouring to develop or improve the same manufactures. Further, there will generally be no exchange of information or results. This means a very serious waste of valuable energy, not only regrettable in itself, but constituting a heavy handicap on the industry concerned, which will be at a great disadvantage compared with its rationalised counterpart in another country, in which all research and development is organised and co-ordinated.

A really efficient scheme of co-ordinated research should permit of the best use of the energy available and the full utilisation of the results obtained, while it should enable the most effective team of workers to be selected for any particular problem. In the chemical industry some of the new problems are of such magnitude and complexity that the only real hope for their speedy and efficient solution lies in a mass attack on them by a large and highly-trained staff of different kinds of specialists. Such a staff can really only be provided and maintained by an industry working not as a series of units competing against each other, but as a single co-ordinated and harmonious whole, which concentrates all its energies on out-doing its rivals. The work of the research associations has been of great value to industry, but these associations deal primarily with fundamentals, and there is much need for greater co-operation in the application of the scientific data which they provide for industry.

### Concentration of Production

It is generally agreed that, in most manufactures, more economical working can be obtained by concentrating production in a few large centres than by having a large number of small and widely distributed units. In many cases, the plants available in a country for producing a particular commodity have an actual capacity far in excess of normal requirements, and are therefore compelled either to produce at a reduced rate or to close down for periods. It is therefore essential for the most economical working that production should be concentrated in a few centres, carefully chosen from both the technical and commercial aspects.

Such regrouping of production requires to be done with great care. In certain instances, however, as, for example, when the product is used over a wide area and the transport charges are heavy in relation to the cost of the material itself, the most economical course may be to have a number of small units distributed over the country. In concentrating production it will generally be advisable to have more than one centre for the manufacture of any commodity as, apart from the desirable reason of not putting all one's eggs in one basket, it enables the competitive spirit to be maintained with consequent advantages in the way of improvements.

The aim throughout is to obtain low production cost, and this may be done by concentrating manufacture in the most suitable works so as to reduce short-time working to the lowest possible limit; by the prevention of the waste of material, labour, or power; by closing the less efficient or remunerative works or departments, with due regard to the maintenance of reserve plant to meet a sudden increase in demand; and by the extension of the most efficient works where necessary and the installation of the best cost-saving plant available at all the works kept in production. This last point requires to be specially stressed.

### Arrangements for Purchase and Sale

Co-ordinated arrangements for the purchase of raw materials and the sale of final products will obviously prove beneficial, since competition between the units of the industry in the markets will be eliminated. More economical arrangements for the supply of raw materials can be made when all the requirements are bulked, intermediate services such as middlemen can be reduced to an indispensable minimum, and unnecessary transport charges can be eliminated by a proper distribution of the raw materials and of the final products. Further, a better sales and advertising organisation can be established and more effective efforts generally can be made for capturing trade, and in particular foreign trade. Production can also be better regulated in accordance with demand.

In this connection, it may be desirable to refer to a criticism which is often levelled against rationalisation, and that is that the selling price of the products of the industry will be maintained, by agreement within the industry, at a level far higher than is justified by the costs of production. It is true that rationalisation will eliminate internal competition, but competition in foreign markets will still be as active as ever. The home consumers will have legitimate cause for complaint if the home prices are consistently much higher than the export prices. Such a state of affairs would give an opportunity to the foreign manufacturer to send his goods into the country, and in this way the price to the consumer would be kept down to a reasonable limit.

### Finance

On the financial side, rationalisation may give immediate benefits by the reduction of cash balances to a much smaller sum than it is necessary for the separate undertakings to provide and maintain. The financial arrangements of a rationalised industry must be on a conservative basis, and adequate provision must be made for research and development, and the constant re-equipment and improvement of plant. Only in this way will the industry be able to ensure its position in face of strong competition. The savings which accrue from rationalisation, after full allowance has been made for depreciation and new developments, must be allocated in such a way that the workers, consumers, management, and shareholders all receive fair treatment.

### Labour Policy

It should be emphasised that it is not part of the scheme of rationalisation to reduce costs of production at the expense of the workers. It is true that rationalisation is likely to lead, at the start, to the reduction of the number of individuals employed in the particular industry being rationalised, but when the number of workers which the industry can employ on a full-time basis has been determined, rationalisation should ensure that their earnings are regular and of greater purchasing value than they would be without rationalisation.

This will mean that the purchasing power of the workers

will increase, and this will lead to an increasing consumption of commodities required for individual well-being and comfort, and thus tend to development and improvement in the industries supplying these commodities. In this way, the rationalisation of the basic industries of a country should lead to increased prosperity in the industrial life of the country generally.

### General Policy and Control

Last, but by no means least, is the need for some sort of unified central direction for the industry, which will act as a central intelligence organisation, formulate the general policy to which the industry has to work, and decide on the schemes of reconstruction which are to be carried out. The nature of this controlling body will depend on the form which the rationalisation takes.

Rationalisation is not the restriction of output to create a shortage and to maintain prices at a remunerative level whatever the costs of production may be. Such methods are anti-social; they check the expansion of markets, restrict employment, and may put a premium on inefficiency by providing profits to businesses of which the management, organisation, equipment, and methods may be far below the standards set by present-day requirements.

Rationalisation, on the other hand, requires the utmost exercise of the co-operative spirit, the pooling of the results of research, and of all technical and scientific knowledge, and the subordination of private interests for the general good of the whole industry.

### Organisation for National Rationalisation

It is now necessary to consider the possible ways of effecting rationalisation of an industry. In the first place, it is not considered that nationalisation would be a satisfactory method, since an industry organised on Government Department lines would become a ponderous and slow-moving machine, which could not possibly satisfy the requirements for quick decision and action which are essential in modern commercial activities, especially where keen foreign competition is involved.

Two other methods are available, namely, (1) amalgamation; (2) association. By amalgamation is meant the combination of all the units or individual firms in the industry into one large corporation controlled by a single board of directors. This method has certain great and obvious advantages, because once the policy and scheme of rationalisation have been settled, it is easy to carry them into effect, since there is only one set of interests to consider, namely, those of the corporation as a whole.

Whilst it must be admitted that there are undoubtedly great advantages to be gained by adopting the process of amalgamation as a basis of rationalisation, the disadvantage of the method must not be overlooked. There may be a strong tendency for the headquarters staff of the organisation to immerse itself too much in the executive details of the scheme, and thus to become a bureaucratic, slow-moving organisation, with all the defects that would accrue from a nationalised industry controlled by civil service methods. The British characteristic which has proved so valuable in the development of industry in the past has been an innate individualism which is antagonistic to any form of bureaucratic control, and this is likely to prove one of the strongest arguments against wholesale amalgamation.

There is another danger attached to large amalgamations; they may endeavour, by means of their large resources, to force out of business their smaller competitors by ruthlessly undercutting prices, knowing that their resources permit them to lose money on certain of their products for a sufficient length of time to enable them to eliminate the competitor who depends entirely upon the sale of these products.

### Association

The other method of rationalisation, which has been mentioned under the title of association, is the system under which individual firms retain their separate identity but co-operate in the formation of an association, or co-ordinating body, which will formulate the policy to which the whole industry will work.

This method may have advantages from the point of view of the British individualistic temperament. It obviates the dangers arising from an amalgamation with a top-heavy and ponderous administration, and leaves executive responsibility fully in the hands of the individual units. It requires, however, the existence of a powerful co-ordinating body in which the rest of the industry is prepared to put implicit trust, and the decisions of which the individual units will willingly and loyally carry out. This method of association would, however, present serious objections in practice if the number of individual firms was large.

The best solution might be a combination of both methods. That is to say, the industry should amalgamate to form a small number of fairly large units which could then associate in the formulation and execution of a common policy. Such amalgamation should take place among firms manufacturing the same type of product, even if it means splitting up firms' activities to do so, in order that each of the new units will, as far as is practicable, deal only with one branch of the industry.

### International Rationalisation

The same principles and methods as have been described for national rationalisation could be applied in the international field if the world was constituted and organised so that it would be regarded as one large state. Unfortunately this ideal arrangement is quite impracticable in the present state of world politics. Each of the numerous separate countries of the world desires to maintain its own economic independence and to protect itself against possible hostile aggression.

This means that in many countries industries have to be maintained, in the interests of national defence, which could be more economically and efficiently organised and operated elsewhere. Thus, in practice, many of the methods of national rationalisation cannot be applied, and it appears that international rationalisation may have to be limited to agreements regulating output and prices in the various producing countries and the allocation of markets. In this way the world production of any class of goods would be regulated to conform to the world's requirements for these goods, and unnecessary competition would be eliminated.

### Progress of Rationalisation in Different Countries

Time does not permit of a detailed description of the progress made in rationalisation in the chemical industry in the various countries of the world. Practically every chemical-producing country of importance has made moves in this direction. Here we have the formation of Imperial Chemical Industries by the amalgamation of several companies, bringing together practically all the heavy chemical manufacture of the country and a considerable part of the dye production. In the rest of the dye industry, and in the field of fine chemical manufacture, there are few signs of any moves in this direction. The tar distilling industry in the past few years has formed itself into a series of big geographical groups by the amalgamation of concerns operating in a particular area. The most recent developments have been the formation of the Lancashire tar distillers and Scottish tar distillers within the last few months. The formation of Scottish Agricultural Industries, Ltd., last year, was the first step towards rationalisation of the fertiliser industry of Scotland. The soap industry is represented by Levers, and their recent agreement with the Margarine Union represents another important advance.

In Germany we have the big I.G., while in the United States we find amalgamations going on continually, but they are somewhat handicapped in this direction by the anti-trust legislation. In France, we have an excellent example of the type of rationalisation which depends partly upon amalgamation and partly on association.

### Imperial Rationalisation

Attempts at international rationalisation have, so far, been few, but among them may be included the working agreement which the I.G. has made with the French and Swiss dye industries and the recent arrangements between I.C.I., I.G., and the Chilean Government with regard to synthetic nitrogen and nitrate of soda. These agreements are very limited in their scope compared with the examples of national rationalisation which have just been quoted.

We have, however, in our own Empire a wonderful opportunity for a really extensive and effective scheme of rationalisation. Our Colonies and Dominions are capable of producing practically all the raw materials we need, and a sound scheme of rationalisation by which these resources could be utilised and developed on a truly imperial basis would undoubtedly add to the prosperity and welfare of all parts of the Empire, and solve many of our labour and industrial problems.

# Chemical Analysis of Sewage

## Report of Committee on Uniformity of Method

*A reasonable measure of uniformity is desirable in the methods to be followed in testing the quality of sewage liquors, before and after their purification, and also in the statement of analytical results. Without this, it is difficult to be assured that the same standards are being applied, or that really comparable results are being obtained. With the object of encouraging such uniformity, a conference of professional men interested in the subject was called by the Minister of Health some years ago. A committee was appointed for the further consideration of the subject, and its findings are embodied in a report just issued by the Ministry of Health (H.M. Stationery Office, pp. 71, 2s. 6d.).*

THE committee appointed to consider the question of uniformity in the methods of analysing sewage and sewage effluents was composed of the following: Dr. H. T. Calvert (Chairman), Dr. S. W. Wheaton, Dr. J. A. Glover, Mr. W. T. Burgess, Mr. J. H. Garner, Mr. E. Halliwell, Sir Alexander Houston, Dr. R. A. Lyster, Dr. G. McGowan, Mr. S. E. Melling, Mr. J. A. Reddie, Sir Robert Robertson, Mr. F. Scudder and Mr. H. F. Stephenson.

The committee have taken as the groundwork of their report Part V of the Fourth Report of the Royal Commission on Sewage Disposal ("Report to the Commission by Dr. McGowan, Mr. R. B. Floris, and Mr. R. S. Finlow on Methods of Chemical Analysis as Applied to Sewage and Sewage Effluents": Cd. 1886—IV, 1904). Account has also been taken of a report of a committee of the Association of Managers of Sewage Disposal Works relating to this subject. The present report, an abstract of the principal points of which is given below, is mainly the work of Dr. McGowan.

### The Committee's Report

The committee have met on six occasions. At the first meeting it was considered desirable that the terms of reference to the committee should be formulated rather more precisely than had been done at the conference.

The following terms were agreed upon: (1) To consider methods for carrying out tests of sewage and sewage effluents and how the results should be expressed; (2) to consider whether it is desirable to include certain tests in all analyses and, if so, which tests; and (3) to consider tests appropriate for use at small sewage works.

At the second meeting of the committee the observations of individual members on the terms of reference were considered, and it was left with the chairman to draft a report embodying the views expressed. At the third meeting a draft report was considered, and various amendments were made. At the fourth meeting Mr. Gibbon addressed the members of the committee, who then proceeded to consider in detail the methods of analysis employed by the Royal Commission on Sewage Disposal, and published in the supplementary volumes to their Fourth and Eighth Reports (Fourth Report, Vol. IV, Part V, Cd. 1886—IV; 1904 and Eighth Report, Vol. II, Appendix Cd. 6943, 1913). They also considered various amendments to the draft report. At the fifth meeting the committee agreed upon the following form of report, but deferred presentation of the report until the work of reviewing the publication of the Royal Commission on Sewage Disposal, undertaken by Dr. McGowan, had been completed. At the sixth meeting Dr. McGowan's report was considered, and after some slight amendment was agreed to.

### Methods of Testing

The methods of analysis for sewage and sewage effluents which the committee recommend for adoption are set out in principle in the reports of the Royal Commission on Sewage Disposal, but the Committee considered that these reports should be rewritten in the light of work which has been carried ont since the date of the reports. Much consideration has been given to the various points upon which analysts differ in their procedure, and a certain amount of agreement has been reached. Dr. McGowan kindly undertook, with the assistance of the committee, to re-edit those parts of the Royal Commission Reports dealing with analytical methods in such a way as to embody the general views of the members of the Committee. The task is now completed, and the methods as agreed upon by the committee are now published in the present report.

Considering individual tests in some detail, the Committee recommend that in the test for oxygen absorbed from a solution of acid permanganate, the strength of the permanganate solution employed should be $\frac{N}{80}$ (0·394 grams $KMnO_4$ per litre), that the temperature at which the test is carried out should be 26·7° C. (80° F.), and that the reaction between the liquid and the permanganate solution should be allowed to proceed (*a*) for three minutes, and (*b*) for four hours.

With regard to the test for the determination of suspended matters, the committee wish to recommend that, where possible, the Gooch crucible method should be adopted, but they are of opinion that in the case of some liquids for which it is not judged possible to adopt this method, centrifuging could be used. The suspended solids should be dried at 100° to 105° C.

With regard to the other tests usually carried out, such as estimations of chlorides and of nitrogen in its unoxidised and oxidised forms, the methods described in the report should be followed.

With regard to the test which measures the rate of absorption of dissolved oxygen from fully aerated tap water, the committee recommend that for the present, the method adopted by the Royal Commission on Sewage Disposal should be followed.

The foregoing tests are those which are usually carried out in making a chemical examination of a sewage or effluent. The tests are not by any means exhaustive, and a trained chemist would be able to apply other tests for particular purposes.

### Lapse of Time Between Sampling and Analysis

It was brought to the attention of the committee that differences in the results obtained by different analysts sometimes arise owing to the lapse of time between the taking of a sample and the commencement of the analysis. The committee recommend that samples should, if possible, be examined within 24 hours of being taken, but in all cases the time which has elapsed before the analysis is commenced should be stated in the report.

The committee gave consideration to the question of gauging and sampling, and wish to draw attention to the importance of these two operations, especially in cases where samples of sewage are being taken with a view to designing sewage treatment works. The committee recognise that samples may be taken for various purposes, and that the method of taking the sample as well as the tests to be applied will depend upon the purpose for which the sample is taken. They do not, therefore, make any specific recommendation on these points, but are of opinion that the methods employed for gauging and sampling should be stated when reporting.

Accurate gauging, apart from the engineering side of the question, is of the first importance when average samples of a sewage have to be taken, in order to determine its strength. By "strength" is meant the measure of the amount of oxygen which a given volume of sewage requires for (practically) complete biochemical oxidation. 100,000 parts by weight of sewage of average strength require about 100 parts by weight of oxygen.

### Method of Expressing Results

The committee recommend that the results of analyses should be expressed in parts by weight per hundred thousand parts by volume; that estimations of ammonia, organic nitrogen, nitrites and nitrates should each be expressed in terms of nitrogen; and that the results of chloride determinations should be expressed in terms of chlorine.

The committee considered whether the examination should be carried out on the sample containing its suspended matter or whether the sample should be settled or filtered before analysis. If the object of the analysis is to form an opinion upon the suitability of the effluent for discharge into a stream,

the committee agree with the recommendation of the Royal Commission on Sewage Disposal that the analysis should be carried out on the sample with the suspended matter included.

### Tests to be Included in All Analyses

The tests to be included in any analysis will be determined by the purpose which the analysis is to serve, but, generally speaking, most analyses should include estimations of suspended matter, free and saline and albuminoid ammonia, oxygen absorbed from an acid solution of permanganate, chlorides, and, in addition, in the case of effluents, estimations of nitrites, nitrates and the Royal Commission test for dissolved oxygen taken up from the aerated tap water. Care should be taken in referring to the two tests involving the absorption of oxygen that a clear distinction is drawn between these tests as above referred to—viz., (*a*) Oxygen absorbed from permanganate; and (*b*) Dissolved oxygen taken up from aerated tap water.

### Tests Appropriate for Use at Small Sewage Works

Most of the tests enumerated require the services of trained chemists or assistants having some chemical manipulative skill, but such persons are not usually available at small sewage works. The committee consider that of the above tests those which could reasonably be expected to be carried out at small sewage works are the tests for oxygen absorbed from permanganate in three minutes and four hours. In addition, the incubator tests and the indigo reduction test will be found of value.

# Dr. Levinstein's Plea for Patent Law Reform

## Suggested New Statute of Monopolies

*In an address to the Bristol Section of the Society of Chemical Industry recently, Dr. Levinstein, the President of the Society, commented strongly on the present position of our Patent system, urged that the time had come for its revision, and suggested that a patent, once granted, should include the right to practice the invention for which it was granted without the risk of costly legislation to decide its validity.*

"Is it not an abominable restraint of trade and a gross abuse," Dr. Levinstein asked, "that we are fettered annually by the State with an enormous number of patent monopolies, which, if exercised, would be improperly exercised?" He pointed out that the growth of patent applications in Britain was rapidly increasing. The figures for three years were:

| | |
|---|---|
| 1926 ..... | 33,094 |
| 1927 ..... | 35,487 |
| 1928 ..... | 38,593 |

He had no hesitation in saying that a very large proportion of these 38,593 patent applications would be declared invalid if tested in the Law Courts. "To remove the mass of bogus, bluff, blocking paper patents, valueless but with a menace grinning through the paper mask, would be a wonderful relief to small firms. Have we not reached a time when a President of the Board of Trade, indeed the Cabinet, may well consider, after an interval of 300 years, that the time has arrived for a new Statute of Monopolies to limit the grant of patents to those who do a service to the State?"

### Cost of Patent Actions

Dr. Levinstein argued that there should be a rigid examination before granting a patent. Once granted, it should confer, not only a monopoly, but the right to exercise that monopoly within the limits of the patent grant. The time to determine the state of "common knowledge" was before the grant of a patent, not years later; the place the Patent Office, not the Law Courts.

The cost of fighting a patent action for both parties was between £600 and £1,000 a day. There might be people consistently taking out numbers of patents which they knew would not stand the High Court test. If this was so, why should people spend large sums of money in application and renewal fees for such patents? The answer was plain. In this way they could put a fence round land which belonged to the public. They might be endeavouring to keep this land, to which they had no real right, their own, by threatening those less wealthy with an action. How many companies or individuals could afford to risk a patent law suit? Indeed, threats were not always necessary to frighten people from using inventions improperly protected.

Many a man had been unable to utilise his own invention because it was inside the wide claims of an existing specification that could not possibly be upheld in a court of law. In any case, nobody wanted to start a new manufacture requiring capital if the consequence might possibly be a patent action.

"The power of roping off chemical territory and defying anyone to cross the rope, a slender skein of paper patent, is only possible in England," he declared. "It is only in England that the cost of fighting a patent action is so high and the nature of the verdict so 'chancey.' If a patent is given to a wealthy corporation for something which has no real subject matter, the effect may be that the State is helping this corporation to oppress a smaller independent manufacturer who is entitled to make and trade in the product claimed, but is afraid of the expense of fighting an action. To remove the mass of bogus patents would facilitate the influx of capital for developing real improvements, especially those made outside the big corporations; for the big companies can better look after themselves. To the smaller manufacturer, to the independent inventor, the granting of patents only after examination for novelty and subject matter and the consequent security, would be a gift from Heaven.

"When one reflects upon the many discouragements imposed on a British manufacturer endeavouring to develop his own existing, or new, manufactures in this country—heavy taxation, the high cost of labour, the difficulty of finding markets—is it not a staggering thought that we have been faced in this country with over 100,000 applications for monopolies within the last three years? The majority of them are foreign-owned, the owners of which, we may safely assume, have no desire to introduce a new manufacture into this country.

"The cost of taking out a patent and keeping it in force for four years is £5. For a £5 note a man can block his competitor for four years. He takes out a worthless patent, a patent showing neither subject-matter nor invention, and no man can use the process so disclosed unless he is willing to fight an action, and he can go on doing this year by year so long as he is willing to pay the renewal fees. The total fees to keep a patent in force for its whole life amount to £126.

"Less than 10 per cent. of the patents granted are kept in force for sixteen years, their legal life. Less than 10 per cent., therefore, are considered by their owners to be worth £126. If less than 10 per cent. are considered worth £126 by their owners, it would seem that it could have been no great hardship to anybody if over 90 per cent. had not been granted."

### Legal Threats

Alluding to legal actions which had been fought, he said it was surely an archaic system which granted to a company and those who came later a patent that encouraged them to trade in a product, and then, years afterwards, held them liable to damages for having exercised the monopoly which they were granted. The State granted monopolies, took fees, but gave no legal right to exercise these monopolies.

In two big patent lawsuits the defendants alone had introduced a new manufacture into the realm. Was it common sense to frighten off those who wished to introduce a new manufacture by the very patent system established to encourage them? Was it good business for the State, particularly to-day, when unemployment was the great problem?

Thousands of unjustified monopolies were being legally granted, and sometimes the holders threatened the very existence of those invading their privilege. There was no way of making patent actions cheap. Counsel who could grasp chemical facts and present them to a judge effectively from a legal point of view were scarce. If patent actions were bound to be expensive, they were bound to place great powers in the hands of wealthy people which could be easily abused.

# Pure Beryllium Oxide from Beryllium Ore

## Work at the National Physical Laboratory

*The first meeting of the session of the London Section of the Society of Chemical Industry was held at Burlington House, Piccadilly, London, on Monday, Professor G. T. Morgan, F.R.S. (chairman of the Section), presiding.*

Two papers were read at the meeting, the first being "A New Method for the Production of Pure Beryllium Oxide from Beryllium Ores," by H. A. Sloman.

The Chairman said that the paper was the result of work that had been in progress at the National Physical Laboratory for three years, and it illustrated the first step that had to be taken in the production of material from which pure beryllium metal could be prepared. It was very important that beryllium oxide should be free from other metallic oxides, and Mr. Sloman had evolved a very interesting and efficient method for effecting this result.

### Origin of the Work

Mr. Sloman said that the work described in the paper arose in connection with the development at the National Physical Laboratory of a method for the electrolytic production of metallic beryllium. In this process the bath consisted primarily of molten beryllium fluoride, which it was not found possible to obtain commercially in any quantity.

For the early work, therefore, supplies of commercially pure beryllium carbonate or oxide were converted into the fluoride in the laboratory, but it was found that the purity and beryllium content varied widely from one consignment to another. In addition, large quantities of valuable beryllium-containing residues resulted from the electrochemical operations, and a means of recovery was very desirable. It was decided, therefore, to investigate the possibilities of developing a new method for the extraction of beryllium oxide from the ores and residues which should be simple, cheap and easily adaptable to works scale.

### Treatment of the Ore

The chief ore of beryllium—beryl—was widely distributed within the Empire in South Africa, Australia and Canada, several large deposits having recently been noted. Much attention had already been given to methods of attacking the ore, and that due to Copaux was finally adopted as the most suitable. That ultimately led to the production of a solution of crude beryllium sulphate, but from that point an entirely new line of procedure was followed, and experiments over a period of three years had shown that a final product could be obtained having a purity that no commercial supply of beryllium oxide or carbonate had yet approached.

The opinion was confidently expressed by the author that on a works scale the process—which was the subject of letters patent—would easily compete in cost with the methods at present in use. The only reagents necessary were crude products, except the distilled water—namely, sulphuric acid, ammonia and hydrogen peroxide—and the quantities are comparatively small. The opinion was also expressed that on a works scale the by-product—hydrogen fluoride—could be made to pay half the cost of operation. Moreover, the operations could be made to a large extent automatic.

The oxide produced by the method was a very fine, light powder, and was stored in airtight glass bottles, owing to the readiness with which it took up carbon dioxide and water. The average analysis of the final product was: BeO, 86·42 per cent.; loss on ignition, 12·98 per cent.; $SO_3$, 0·2 to 0·3 per cent.; $Na_2O$, 0·10 per cent., with a trace of other impurities. There was also up to 0·10 per cent. of fluorine, representing the last traces of fluoride not removed. The analysis showed the product to be free from metallic impurities except for the very small amount of sodium, which, together with the small amount of $SO_3$, was anticipated to prove quite harmless for all purposes.

### Extraction of Helium from Monazite Sand

The second paper dealt with "The Extraction of Helium from Monazite Sand," and was presented by Mr. R. Taylor. The chairman said that Mr. Taylor had been engaged for some time in the isolation of helium from monazite sand. When the work was started, it was practically impossible to obtain helium in this country, and, although large quantities of the gas were being produced in America, export of it was prohibited. One result of the researches of Mr. Taylor appeared to have been that this prohibition had been lifted.

Mr. Taylor said that the helium content of monazite sand, which was obtained from Travancore, India, was of the order of 1 c.c. per gram. It was thus estimated that for every 100 tons of monazite sand worked up, approximately 100,000 litres of helium were allowed to escape into the atmosphere. The requirements in sand for these experiments had been met through the kind assistance of the late Mr. Edmund White, formerly managing director of Thorium, Ltd., who arranged that the firm should lend to the Teddington Chemical Laboratory, free of charge, the necessarily large quantities of monazite sand employed in the experiments.

### Heating Experiments

Small scale experiments were first made on the liberation of helium from monazite sand by simple heating, and these gave a yield of 0·63 c.c. per gram at 800° C., and 0·68 c.c. per gram at 900° C. A weighed quantity of sand was placed in a porcelain tube, closed at one end and connected at the other end to a Töpler pump. Evacuation was carried out to a pressure corresponding to an X-ray vacuum, and the tube was heated in an electric furnace for three hours at the temperature indicated. The gases liberated were drawn off by the pump, collected and measured over mercury. An analysis of the gas liberated at 900° C. gave the following composition, which was remarkable for its low percentage of helium:—Helium, 34·5 per cent.; hydrogen, 30·3 per cent.; carbon dioxide, 24·3 per cent.; carbon monoxide, 0·1 per cent.; hydrocarbons, 1·7 per cent.

This analysis was made the basis of the purification process which had been developed on a large scale. In this, the monazite sand was heated in two pots made of Hadfield's special heat-resisting steel, 6 in. in internal diameter and 2 ft. 6 in. deep, with an average wall thickness of ¾ in., fitted in a circular furnace lined with firebrick, with an annular space of 3 in. between the pot and the firebrick. The covers of the pots carried a thermocouple sheath, an exit tube for the helium, and an additional pipe reaching to the bottom of the pot for the introduction of carbon dioxide to sweep out the helium as liberated. Gas from the pots was led away to the top of a water trap, and thence to a gas-heated iron tube, 3 ft. 3 in. long and of 1½ in. bore, filled with copper oxide, which oxidised hydrogen and carbon monoxide to water and carbon dioxide respectively. The carbon dioxide was removed by caustic soda in a washing tower, and the washed gas was collected in a water-sealed gas-holder of the usual bell type.

### Purification of Crude Gas

Purification of the crude helium was effected by passing it over metallic magnesium heated to 600° C., the main impurity being nitrogen the efficiency of magnesium in removing the latter being very high. It was then passed over metallic calcium heated to 560° C. It was thus possible to obtain 30 litres of purified gas at the rate of 5 litres per hour, using only 30 grams of metallic calcium. Samples of gas taken from the compressed gas cylinders has been shown to contain at least 99·5 per cent. of helium, the crude helium obtained by the process before purification having the composition: Helium, 96·6 per cent.; nitrogen, 1·3 per cent.; carbon monoxide, 0·9 per cent.; carbon dioxide, 0·3 per cent.; hydrogen, 0·2 per cent.; and hydrocarbons, 0·7 per cent.

The Chairman said the results obtained were a very good example of team work, because, in addition to the author's own work in connection with the process, most of the apparatus had been made at Teddington. The result had been the production of helium which was practically pure. This helium was free from neon, thus differing very much from that obtained from air.

# Industrial Research Associations

## Dr. Pickard Reviews their Work

A MEETING of the Manchester Section of the Society of Chemical Industry took place on Friday, October 4, when Dr. R. H. Pickard, F.R.S., Director of the Shirley Cotton Research Institute, Manchester, and Chairman of the Section, delivered an address, mainly founded on his own personal experience, on the results achieved by Industrial Research Associations in this country, and, more particularly, with respect to the associations engaged in research work in regard to raw material of an animal or vegetable character.

### Cost of Research Associations

There were, Dr. Pickard said, 19 research associations in this country receiving grant aid; their total income was approximately £200,000, about one-fifth of that amount being accounted for by the cotton industry. £60,000 of the total amount was contributed by the State. The largest association was the one devoted to cotton research, and the cotton industry itself was now said to be, or at any rate hoped to be, approaching the end of its vicissitudes, but it must nevertheless be borne in mind that it was still the largest exporting industry of the country. The State assistance to the Cotton Industry Research Association amounted to something like 17 per cent. of the whole expenditure, and was probably less approximately than it was to any other industry. The largest proportion of State assistance to any of the research associations was that given to the Scientific Instruments Research Association. The Department of Scientific and Industrial Research appeared to regard scientific instruments as one of the key industries of the country. The Cotton Industry Research Association, however, had been very much more favourably treated than some others in regard to the funds placed at their disposal. They had received from a body known as the Cotton Trade War Memorial Fund no less a sum than £265,000, and they were to receive another £75,000, and it was largely from these funds that the Shirley Institute had been built up. That Institute, up to the end of last July, had cost approximately £565,000.

### Disillusioned Employers

Ten years ago, when research associations were in their infancy, very few firms had had any experience of co-operative research, British industry not being accustomed to a pooling of knowledge. Disputes in the early days as to how the results of research were to be applied to the advantage of subscribers were much more numerous than in recent years. At the outset a very natural mistake had been made, for which no one was to blame, in leading individual employers to believe that if they subscribed to such associations they would receive the equivalent of dividends handed out to them with regularity. Co-operative industrial research was now understood rather better. There was a growing tendency for all firms to realise that they not only had to subscribe to research associations but also that they had to do a little bit of thinking for themselves. One of the great advantages that the State had obtained for its contributions to research associations was that in industry generally there was now a very much greater amount of hard thinking about the why and the wherefore of processes than there was of the blind following of what might be described as old-fashioned recipes.

### The Search for Directors

At the outset, research associations were faced with a very great difficulty in obtaining directors of research. With the possible exception of cotton, speaking generally, none of the original directors of research associations had had any experience of any form of co-operative research, nor could it be expected that scientific men of the academic type would possess such experience. The university or college professor was largely interested in one particular section of work, and previous to the war he had very few research students and they were usually working along converging lines. It was also, perhaps, natural at the outset that some teachers of technology should feel aggrieved that large sums of money were available for research when they themselves were not invited to take part in its prosecution. Additionally, there was quite a natural feeling on the part of certain scientific men, or people trained in science, who were already engaged in industries, against the formation of industrial research associations.

Another mistake which had been made in the past was in trying to express in print and in figures what the advantage of the industrial research associations had been to an industry or to an individual firm. Personally, he rather sympathised with the position of the practical man. He did not accept the definition of the practical man as being one who knew no theory. The practical man, without the advantage of much boasted science, had produced results which, if not as satisfactory as they might have been, were simply stupendous when impartially examined. The practical man was not always right but he very frequently was.

### Fundamental Research

Fundamental research was the principal function of the industrial research association, and the more it was carried out the greater would be the opportunities for its application. Probably there was not a single research association which would admit that it had sufficient resources to cope with the problems in sight. At the present time, almost every association was spending a large amount of time on what might be termed the application of fundamental results already obtained This implied that the store of fundamental knowledge was not increasing as it should do. Research of a new character had been damped down considerably, and this could not go on for ever; the capital of results must be increased.

The staff of a research association must work as a team, and therefore the individual worker did lose a certain amount of personal freedom; yet there were compensations because the team should always be able to achieve much greater results than the individual worker. About 50 per cent. of the work done by research associations was published, possibly after some delay, but probably in due course this percentage would be increased. Criticism, constructive or other, could only be obtained when results were published. Research associations had been organised by and for the benefit of producers; generally speaking the user had been somewhat disregarded. In the future it would probably be the case that the user's point of view would be more adequately considered.

Dr. Pickard emphasised the necessity for the establishment of central libraries and information bureaux for research associations, from which advice could be obtained for the direction of reading and study by those isolated industrial workers who were not employed in the vicinity of universities and colleges of technology.

A long and interesting discussion followed Dr. Pickard's address.

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# Smoke Emission

## Summons Against Chemical Manufacturers

AT North London Police Court on Monday, W. J. Bush and Co., of Ash Grove Works, Ash Grove, Hackney, London, were summoned by the Hackney Borough Council for permitting dense volumes of black and grey smoke to be emitted from a chimney shaft at their works, thus causing a nuisance to the neighbourhood.

Mr. Chalenor, for the Hackney Borough Council, said he was asking for an order for the abatement of the nuisance, which had been going on intermittently for a long period. Proceedings had been taken before. On the last occasion an undertaking was given that the nuisance would be abated, and the summons was withdrawn. That was twenty months ago, but there had been several complaints since and the Council felt bound to take the proceedings.

On behalf of the defendants, Mr. H. L. Murphy, barrister, now pleaded guilty. There was no intention, he said, on the part of the defendants wilfully to disregard the undertaking given or to cause a nuisance in the neighbourhood. The defendants had been established in Hackney for a hundred years, and were large employers of labour. It was quite true that the undertaking was given. It was the intention of the company to construct an entirely new power house at a cost of £50,000. The work was in progress, but, unfortunately, a number of the parts were broken in transit and the work was delayed. The parts had now been replaced, and in six weeks' time the work would be completed. In order to avoid any danger of a smoke nuisance during that time, the company had gone to the great expense of purchasing Welsh smokeless coal, which would be exclusively used until the new power house was in operation.

Mr. Basil Watson made an order for the nuisance to be abated within three weeks, and allowed the Council £2 2s. costs.

## Chemical Engineering Notes

### Dr. Hatfield's Opening Lecture

THE annual reception by the President of the Institution of Chemical Engineers will take place on Wednesday, November 6, at the New Princes' Galleries, Piccadilly, London. As this is the only social event before the end of the year a hope is expressed in the *Quarterly Bulletin* that as many members as possible will attend to honour Mr. Reavell, whose public activities as president are just beginning. Invitations will be issued shortly.

The forthcoming session will be inaugurated by a public lecture, which will be given on Friday, October 25, in the Lecture Theatre of the Institution of Civil Engineers. On this occasion Dr. W. H. Hatfield, Director of the Brown-Firth Research Laboratories, Sheffield, and a member of the Institution, will give an address on "The fabrication of acid-resisting steel plant." Anyone interested will be welcomed to these public lectures and can obtain tickets for them by applying to the honorary secretary at Abbey House, Westminster, London, S.W.

On Wednesday, November 13, a paper on "Production and treatment of cellulose in the paper industry" will be read by Mr. James Strachan (member). When the arrangements for the visit to the paper mills of the British Vegetable Parchment Mills, Ltd., Northfleet, where some interesting plant is being installed, are completed, further information will be issued.

The December conference this year will be held on Thursday and Friday, December 5 and 6, the subject being "Vapour absorption and adsorption." The opening paper, entitled "The adsorption of gases and vapours: some general considerations," will be contributed by Professor J. C. Philip; other papers are promised by Dr. W. R. Ormandy and Messrs. J. H. Brégeat, K. Evans and H. F. Pearson, J. S. Morgan, H. W. Webb and H. Hollings. The conference will be organised on the same lines as the very successful conference on "Drying" held last December, and it is confidently hoped that members will endeavour to attend and to bring with them any friends interested in this important phase of chemical engineering.

Sir Alexander Gibb, who is acting as the principal delegate of the Institution at the World Engineering Congress in Tokio, left England for Japan in August. He will present an address on behalf of the Institution. Sir Alexander will return by the Eastern route, visiting Singapore and India, and is not expected back until April next.

### Graduates' and Students' Section

It is pleasing to note that the Graduates' and Students' Section has greatly extended its programme of lectures for the forthcoming session. This programme, which has been arranged by a committee formed from the section, shows that this branch of the Institution's activities is in energetic and capable hands. The opening meeting will take place on November 1, when a paper entitled "Tannery equipment" will be read by Mr. Alec Webster (graduate). This meeting will be held at the Boulogne Restaurant, Gerrard Street, London, and will be followed by an informal dinner and smoking concert. It is hoped that members of the section will make special efforts to attend on this occasion, which will be the first on which there has been prearranged opportunity for social intercourse.

On November 29 the President has consented to give a paper on one of the subjects on which he is so outstanding an authority, and the opportunity will be taken to make this an "open" evening, when members and associate-members will be invited to attend.

On February 28 a paper will be presented by Dr. Saunders, of the Department of Scientific and Industrial Research, dealing with heat transfer, and on April 25 a paper on grading in the gas industry by Mr. T. H. Prater (graduate).

In December, 1927, there took place at Larderello, Italy, a celebration of the centenary of the first use of the natural steam of the Tuscan "soffioni" in the manufacture of boric acid. This work has undergone great developments during the century, and with these the name of Prince Ginori Conti has been closely identified. As a memento of the occasion a medal has been struck, showing on the obverse four of the principal scientists connected with these works, including an excellent likeness of Prince Conti, and on the reverse a general view of the works at Larderello. One of these medals has been presented to the Institution by Prince Conti.

### Annual Chemical Dinner

The annual chemical dinner will be held on Friday, November 8, in the Connaught Rooms, London, W.C.1, at 7 p.m. for 7.30. Lord Dewar has consented to preside. Tickets for this function will cost 12s. 6d. per head (exclusive of wine). Complete details will be available a little later.

Mr. Gilbert Davis has returned to this country from South Africa, and is now personal assistant to the managing director of Associated Portland Cement Manufacturers, Ltd.

Mr. F. J. Bailey has joined the research staff of the Woodall-Duckham Companies.

Mr. W. A. E. Rae has accepted an appointment with Whey Products, Ltd.

Mr. J. Vernon Shaw has taken up the duties of assistant manager with the Jeram Rubber Estates, Ltd., at Kuala Lumpur.

Mr. Trevor Thomas has been appointed manager of the "Illingworth" Low Temperature Carbonisation Process at the Allerton Main Collieries, Leeds, for Pease and Partners, Ltd.

## Imperial Chemical Industries' Report

### "Very Strong Financial Position"

THE directors of Imperial Chemical Industries, Ltd., have declared, as at October 17, 1929, on the issued ordinary capital of the company in respect of the year ending December 31, 1929, an interim dividend of three per cent. actual, less income tax at 4s. in the £, to be payable on December 2, 1929, to shareholders on the register at October 17, 1929. The register of ordinary shareholders will be closed from October 17, 1929, to October 31, 1929, both dates inclusive.

In accordance with the terms of the circular to the shareholders dated April 19, 1929, the new issue of ordinary shares will rank for this dividend from May 6, 1929, calculated on the amount per share by way of capital credited as paid up and from the due dates of the instalments.

The interim dividend in question on the new ordinary capital at the rate of three per cent. for the part of the year will, therefore, be satisfied by the payment of a dividend of 3·3879452 pence (gross) per one pound share.

The shareholders will doubtless welcome the following short statement as to the position and progress of the company.

The various industries in the home trade which consume some of the company's major products have not in all instances shown improvement, nevertheless the volume of business in the company's products has been maintained, and in most cases increased. The volume of foreign trade also shows a satisfactory increase. Important developments are taking place in the associated companies in Canada, Australia, and South Africa, of an entirely satisfactory and remunerative nature.

The construction programme outlined by the chairman in his speech at the last annual meeting is proceeding normally, and is, in fact, in advance of schedule. The large development foreshadowed at the Billingham works of Synthetic Ammonia and Nitrates, Ltd., is now reaching completion. The plant which has been put into operation is working satisfactorily, and it is expected that the last unit for the production of ammonia and ammonium sulphate will commence work in the course of this month.

The expectation expressed by the chairman at the annual meeting that the results of this financial year would enable the same rate of dividend as last year to be maintained on the increased capital is being fully justified and can be said to be assured.

The company's financial position, owing to the new capital recently issued and paid up, is now very strong and liquid, and the directors are fully satisfied with the progress of the company and its operations during the present year.

### Preservatives Regulations Offence

A FINE of £3 was imposed on Monday, at Consett, on Robert Robertson, for selling sausage containing a prohibited preservative, boric acid. Boric acid was prohibited as a preservative in 1927. On analysis, the sausage was found to contain four grains of boric acid per pound.

# Society of Public Analysts

An ordinary meeting of the Society of Public Analysts was held at the Chemical Society's Rooms, Burlington House, London, on Wednesday, October 2, the president, Mr. Edward Hinks, being in the chair.

Certificates were read for the first time in favour of A. G. Avent, W. R. Davies, E. R. Dovey, J. Gray, J. Henderson, C. A. Scarlett, P. A. W. Self, T. B. Smith.

Certificates were read for the second time in favour of J. W. H. Johnson, Miss M. Olliver, and G. E. Shaw.

The following were elected members of the Society:—A. N. Leather, R. H. Morgan, and W. G. Painton.

### Chemical Tests and Fur Dermatitis

A paper on "Chemical Tests in Relation to Fur Dermatitis" was read by Dr. H. E. Cox, M.Sc., Ph.D., F.I.C. Paraphenylenediamine, he said, was the most frequently used of the intermediates employed for dyeing furs and was also the most toxic. The process for extracting the most common intermediates was described, and tables of their reactions were given. The opinion was expressed that the so-called Bandrowski's base was not a fast final product; it was easily reduced and then re-formed *p*-phenylenediamine, and so might be an indirect cause of irritation. In the author's experience, it was also associated with some partly oxidised *p*-phenylenediamine, which could be detected by the chemical reactions described. The spectroscopic method, as ordinarily applied, was unsuitable for the identification of these oxidation products.

### Nomograms in Gas Analysis

"A Nomogram for Use in Gas Analysis" formed the subject of a communication from Mr. J. H. Coste. In the nomogram demonstrated, four graduated lines represented the logarithms of the natural numbers inscribed upon them. By the use of the nomogram the necessary corrections of temperature could be made over a reasonable range of temperature, with sufficient accuracy for many purposes.

### Irish Winter Butter

Mr. P. S. Arup discussed "The Composition of Irish Winter Butter." Analyses were given of 580 undoubtedly genuine samples of butter obtained from creameries and agricultural schools in the Irish Free State during the winters of 1927–8 and 1928–9. In the former period, 50 samples showed Reichert-Meissl values below 24; in the latter period, 88 samples. In places where calving was not confined to one season of the year (as is generally the case in Ireland), and also where the conditions of feeding and shelter were superior, Reichert-Meissl figures below 26 were not obtained. Similar effects were noted with regard to the Polenske values. The conclusion that the Avé-Lallemant value cannot be accepted as a criterion for distinguishing between adulterated butters and genuine butters with a low Reichert-Meissl value was confirmed.

### Analysis of the Rare Earths

Two papers were read by Dr. W. R. Scholler and Mr. H. W Webb, entitled "Investigations into the Analytical Chemistry of Tantalum, Niobium, and their Mineral Associates. XVI.—Observations on Tartaric Hydrolysis. XVII.—The Quantitative Precipitation of the Earth Acids and Certain Other Oxides from Tartrate Solution." Precipitation of the earth acids from tartrate solution by hydrochloric or nitric acid, shown in a previous paper to be a sensitive and specific earth-acid reaction, has now been investigated as a quantitative method. Precipitation of tantalic and niobic, also tungstic, acids is never quite quantitative; a few milligrammes escape precipitation when the bulk of solution is 200 to 300 c.c. Of all the other mineral associates of tantalum and niobium, only titanium and zirconium interfere to a certain extent with the normal course of the reaction. Means for obviating this interference will be studied; the recovery of the small fraction of non-precipitated earth acid from the tartrate solution is ensured by tannin or cupferron. The earth acids are quantitatively precipitated from tartrate solution by tannin after neutralisation or addition of an excess of ammonium acetate; zirconia and titania are likewise precipitated, but accurate neutralisation after addition of the tannin is required. Thoria and alumina are precipitated like the earth acids. The earth acids and their mineral associates are classed into analytical groups according to their precipitability from tartrate solution.

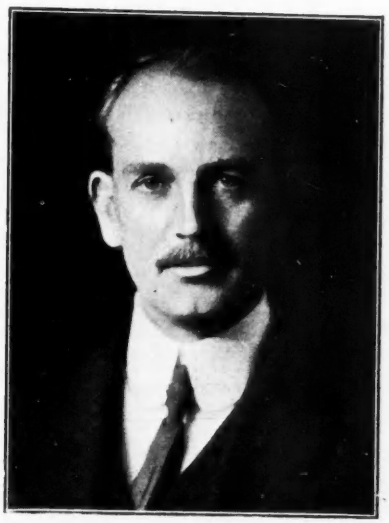
### Annual Chemical Dinner

The annual chemical dinner, to be followed by a dance, will be held on Friday, November 8, at the Connaught Rooms, London. Members of the following Societies and Institutions are invited to participate:—The Chemical Society, the Institute of Chemistry, the Society of Chemical Industry, the Society of Public Analysts, the Faraday Society, the Biochemical Society, the Institution of Chemical Engineers, the Institution of Petroleum Technologists, the Oil and Colour Chemists' Association, the Association of British Chemical Manufacturers, Society of Dyers and Colourists, the British Association of Chemists, and the Chemical Industry Club. Lord Dewar has consented to preside.

Tickets, price 12s. 6d. each, for lady or gentleman, including gratuities but not wines, should be applied for before Friday, November 1.

Dinner will be served at 7.30 p.m.; speeches will be few and short; dancing will begin soon after 9.15 p.m. Mr. F. A. Greene is again acting as hon. secretary of the dinner.

### Dr. F. E. Smith, F.R.S.



Dr. Smith has just been appointed Secretary to the Department of Scientific and Industrial Research in succession to Mr. H. T. Tizard, F.R.S.

### Foreign Reports of I.C.I. Developments

The German technical press reports, through the Italian *Giornale di Chimica Ind. et Applicata*, that Imperial Chemical Industries has sent various representatives to South America to investigate the possibilities of investing capital in Argentina, Brazil and Chile. Argentina has been found to be an important market for sulphuric acid, and I.C.I. has therefore, it is said, decided to inaugurate a programme of expansion in South America by the erection of a sulphuric acid plant in Argentina. A sulphuric acid plant is already in existence, near Buenos Aires, and this is to be extended on modern lines (using the contact process), the production being doubled to a capacity of 10,000 tons a year. Subsequently, other branches of industry are to be developed, such as the production of electrolytic alkali and of superphosphate. The production of tartaric acid is also mentioned.

### Gold in Gum Sample

The possibility of a new discovery of gold is suggested by a report on Somaliland, just issued. Gold was discovered in the residues of a gum sample sent to an English confectionery firm, and as a result an investigation was made into the possibility of the metal being found in the area from which the gum was obtained. Some of the quartz reefs and veinlets in the district were distinctly "favourable," and samples were sent to the Imperial Institute for assay. From what was seen, adds the report, it is advisable that all foothills in the area should be examined in the near future.

## Presentation to American Professor

THE photograph below shows Mr. L. Moreton Parry, the president of the Pharmaceutical Society of Great Britain, presenting the Hanbury Memorial Medal to Professor Henry

Hurd Rusby, of Columbia University, at the Pharmaceutical Society's headquarters in London.

### Chemical Society Meeting

THE next ordinary scientific meeting of the Chemical Society will take place on Thursday, October 17, at 8 p.m., at Burlington House, London. The following papers will be read: "The Modes of Addition to Conjugated Unsaturated Systems. Part II.—The Reduction of Conjugated Unsaturated Acids by Metals Dissolving in Aqueous Media," by H. Burton and C. K. Ingold; "Synthesis of Anthracene Homologues. Part I.—2:6-and 2:7- Dimethylanthracenes," by G. T. Morgan and E. A. Coulson; "Dynamic Isomerism Involving Mobile Hydrocarbon Radicals. Part I.—The Triarylbenzenylamidines," by A. W. Chapman; "Studies of Valency. Part XIV.—An Optically-active Telluronium Salt; *p*-tolylphenylmethyltelluronium Iodide," by T. M. Lowry and F. L. Gilbert; "Studies of Valency. Part XV.—Optically-active *p*-tolylphenyltelluroxide," by T. M. Lowry and F. L. Gilbert; and "Synthesis of Anthracene Homologues. Part II.—2:3:6-trimethylanthracene," by G. T. Morgan and E. A. Coulson.

### Committee on Gas Poisoning

THE preliminary meeting of the Committee on Gas Poisoning was held at the Board of Trade on Tuesday. Sir Evelyn Cecil presided. An official statement issued at the conclusion announced that Mr. Bowerman, M.P., referred to the increase in the number of deaths from coal-gas poisoning, and stated that during the past twenty years the amount of carbon monoxide present in coal-gas had been increased from about 7 per cent. to an amount which was seldom less than 12 per cent., and might in some cases be more than 20 per cent. The committee of 1921 had reported against any limitation of the proportion of carbon monoxide in gas used for domestic purposes, and suggested reconsideration of this freedom from limitation if it resulted unfavourably. Mr. Bowerman hoped the committee would look into the matter.

## Gum in Petrol

### Papers Before Petroleum Technologists

AT a meeting of the Institution of Petroleum Technologists on Tuesday, three papers dealing with the problems presented by the formation of gum in petroleum were read. The first was entitled "The Estimation of Gum in Petrol and its Significance," and was by Lieut.-Col. S. J. M. Auld, D.Sc.

#### Estimation

In this paper, the author arrived at the conclusion that the estimation of gum by any evaporation process was not really satisfactory. In the meantime, any evaporation process which gave concordant results with a minimum of gum formation during the test might be regarded as suitable, providing it could be correlated with the behaviour of the fuel in engine operation. A procedure was suggested for the purpose. It was further pointed out that it was not difficult to produce motor spirit of high unsaturated content, *e.g.*, a vapour phase cracked spirit, to give good engine performance without gum trouble.

Gum content, as ordinarily measured, might be quite appreciable without affecting engine performance. A conservative limit could be placed to this gum content if the *modus operandi* of the test was agreed upon. This applied to pre-formed gum. It was not at present possible to recommend a test of gum stability for general use to meet all requirements. Such a test was needed owing to the wide variation of gum-forming tendency, especially as regards properly and improperly prepared vapour phase products. Practical limits must be set to such a test in order that no undue hardship should be placed on the petroleum industry in its endeavour to provide high anti-knock fuel from its own resources.

#### Deterioration by Gumming

Drs. J. W. Mardles and H. Moss submitted a paper on "The Deterioration of Cracked Spirits by Gumming." According to their view, the gumming of cracked spirits was essentially an oxidation process involving the initial formation of organic peroxides. The rate of gumming was increased by aeration, by rise in temperature, by the action of actinic light, and by the presence of deleterious substances, such as certain sulphur compounds and substances which readily became peroxidised. Deterioration was inhibited by absence of aeration, by the addition of "anti-oxygens" such as phenol, thymol, etc., and to some extent by surfaces, such as that of soda lime, iron or copper gauze, water, etc.

#### Anti-Knocking Properties

The anti-knock properties of cracked spirits, said the authors of the paper, were impaired by the gumming and general deterioration during storage in presence of air. This was due to the fouling of the engine interior, to the presence of organic peroxides which strongly induced knocking, and to the partial removal of hydrocarbons of higher anti-knock value. The determination of the gum content of a fuel of suitable volatility could be conveniently and quickly determined with a fair degree of precision by evaporation in a copper or glass dish on an actively boiling water bath. The employment of special methods involving evaporation in steam or in inert gases required elaborate apparatus, and the duration of the test was usually longer. Results with the use of steam were equivocal, since steam was not without action on the gum.

#### Gum Formation in Cracked Gasolines

Messrs. C. K. Wagner and J. Hyman presented a paper on "Gum Formation in Cracked Gasolines." In this paper they described work leading to a theory of gum formation. It was shown that some relation existed between peroxides and gum formation. The evaporation of peroxides caused their decomposition, acrolein, among other things, being formed. Acids (other than the common organic acids), per-acids, especially, seem to act catalytically. A scheme was put forward indicating the manner in which gums were formed from olefines.

### German Chromate Exports

GERMAN EXPORTS of sodium chromate and bichromate amounted in 1928 to 5,400,000 lb., an increase of approximately 1,200,000 lb. The chief markets were European countries, including Great Britain, France, the Netherlands, and Spain.

# From Week to Week

THE HON. HENRY MOND, who has been on a visit to the United States, has now returned to England.

SIR WILLIAM ALEXANDER left Southampton for the United States by the *Mauretania* on Saturday, October 5.

MR. H. E. MIDGLEY, director, chief engineer and general manager of the Foundation Co., has resigned to join the board of Ruths Steam Storage.

AT AN EXTRAORDINARY GENERAL MEETING of the Mond Nickel Co. on Tuesday, the resolutions passed on September 14 were unanimously confirmed.

SEVERAL EARTHENWARE CONTAINERS, of capacity 50 to 100 gallons, and certain other pieces of apparatus, are wanted by an advertiser. Details are given on p. xxvii.

THE COAL SMOKE ABATEMENT SOCIETY and the Smoke Abatement League decided, at a meeting at Buxton on Saturday, October 5, to amalgamate, under the title of "The National Smoke Abatement Society."

A REPORT from the Board of Trade Surveyor's Office, Middlesbrough, discusses an explosion from a feed water delivery pipe which took place at the works of Synthetic Ammonia and Nitrates, Ltd., Billingham-on-Tees, on April 11.

THE CYANIDE WORKS of Imperial Chemical Industries, in conformity with the company's policy of centralisation, are to be transferred from Maryhill, Glasgow, to Billingham-on-Tees. The transference will not take place until next summer.

THE CHIMTRUST, the organisation responsible for the control of the Russian chemical industry, intends to produce 30,000 tons of sulphuric acid in the coming year, as compared with 20,000 tons. New sulphuric acid plants have been erected in the factories at Krassni and Ochtinsk.

THE DUCHY OF CORNWALL is reported to have given permission to Whitehall Securities, Ltd., to prospect for China Clay at Borden, close to the headwaters of the River Dart. It is said that deposits in paying quantities have been found, and that machinery for further working has been ordered.

SIR REGINALD SOTHERN HOLLAND and Sir Charles W. Fielding have resigned their seats on the board of directors of the British Metal Corporation, Ltd., and Sir Evelyn A. Wallers and Lieut.-Col. the Hon. R. M. Preston, who have acted as alternate directors for these gentlemen respectively, have been appointed in their places.

MR. PETER MCG. GORDON has been appointed on the propaganda staff of the Chilean Nitrate Committee, and will take charge of the southern part of Scotland. Mr. Gordon, who has had considerable experience in farming, was awarded the Wardlan-Ramsey Memorial Prize as the most distinguished student at the East of Scotland Agricultural College.

A CHEMICAL RESEARCH BUREAU, with American participation, has been established in Zurich, Switzerland, under the name of Colloid Chemical Research, Inc. The purpose is not only to conduct chemical research, especially in the colloid-chemical field, but also to acquire patents and processes for commercial development, and to erect laboratories in Switzerland and abroad.

DR. G. C. CLAYTON, formerly M.P. for Widnes, was one of the passengers on the Canadian Pacific liner *Duchess of Richmond*, which sailed from Liverpool on Friday, October 4, for Canada. He is proceeding on a tour which includes Canada, Japan, China, and India. Although it is primarily a holiday trip, Dr. Clayton will combine business with pleasure in the interests of Imperial Chemical Industries.

THE DOMINION BUREAU OF STATISTICS (CANADA) has just issued figures for the year 1928 relative to the production in Canadian chemical plants of miscellaneous articles such as adhesives, baking powder, boiling compounds, sweeping compounds, etc., the total value of which reached $12,832,787, as compared with $11,900,521 in 1927. In 1928 there were 128 plants in this industrial group, the total capital investment being $10,700,000, employees numbering 2,023.

AMMONIUM SULPHATE is not produced in Greece but is imported chiefly from Germany. Owing to the need for this product by local industries, it is imported duty free from countries enjoying most-favoured nation treatment. It is imported either direct by local manufacturers or through local commission agents. Price is a determining factor in this commodity, and Germany is the main country of supply owing to the more attractive quotations offered to the local trade. Imports of ammonium sulphate during the years 1927 and 1928 amounted to 3,899 tons and 1,733 tons, respectively.

THE MONTREAL SECTION of the Society of Chemical Industry announces the appointment of Mr. Clayton W. Reynolds as secretary-treasurer of the Montreal Section, replacing Mr. H. P. Foran, who recently resigned to accept a position on the staff of Shawinigan Chemicals, Ltd., at Shawinigan Falls. Mr. Reynolds has had a wide experience with the industrial chemical trade of Canada and England, having been associated with Brotherton and Co., England; the Barrett Co., tar distillers, Montreal; and the British Chemical Co., of Trenton, Ont. He is now assistant to the manager of the chemical department and dry colour works of the Canada Paint Co., Montreal.

MR. JAMES A. RAFFERTY has been elected president of the Carbide and Carbon Chemicals Corporation, of New York.

THE INTERNATIONAL UNION of Pure and Applied Chemistry, which last met in 1928 at The Hague, will hold its tenth conference in Liege in 1930.

DR. T. V. BARKER, lecturer in chemical crystallography in the University of Oxford, has been elected to a professional fellowship at Brasenose College.

RUSSIAN PRODUCTION OF MANGANESE ORE has amounted in the last 10 months to 897,389 tons, as compared with 314,452 tons in the former corresponding period.

RECENT WILLS INCLUDE:—Mr. John Drinkwater Kay, of Oaklands, Blackley, Manchester, a director of the Bleachers' Association, Ltd. (net personalty, £61,446), £65,777.

BURT, BOULTON AND HAYWOOD, LTD., are, according to a German report, engaged in the development of a tar distillation plant which is being built in connection with an ironworks at Neunkirchen, in the Saar district.

THE APATITE DEPOSITS at Ipanema, Brazil, are being worked by about 100 men, under the State Government. The rock, which is low grade, is being concentrated under the direction of German engineers from the mining school at Freiburg.

THE UNDERFEED STOKER CO. announce that they have secured the sole manufacturing rights for vibro-conveyors under the Schenck-Heymann system, and that the conveyors will be manufactured entirely at the company's works at Derby.

A VERDICT of "Accidental death" was returned at the inquest at Middlesbrough, on October 4, on Charles Barnard Hogg, a workman, who, while engaged in the unloading of wagons into a hopper at the river side, at the Billingham works of Synthetic Ammonia and Nitrates, Ltd., was caught in the wheels of some trucks which became unbraked and received fatal injuries.

A NEW LEAD-SMELTING PROCESS is being perfected at the Port Pirie smelters, in Australia. According to the principal of the Adelaide School of Mines the discovery will revolutionise methods in use. The process is one for separating gold and silver from lead, and converts the present involved method into a continuous and straightforward one. It also greatly reduces the cost of plant.

THE SPANISH GOVERNMENT is giving special attention to the promotion of chemical industry. The Minister of Public Works recently stated that 400,000 kilowatts of electric energy would be necessary to produce the annual Spanish requirements of 80,000 tons of nitrogen products. The "Council of Energy" is to have in charge the study of this project, the development of which will cover a period of years.

MR. F. WEINREB states that in an article in the issue of this journal for September 28, on p. 284, under the heading "Acid-Proof Chemical Stoneware," it was said that D.T.S. iron-armoured vessels with an internal lining of acid-proof chemical stoneware could be supplied in capacities up to 1,000 litres. This, he points out, should read 10,000 litres (2,200 gallons). Vessels have, moreover, been supplied, having an internal lining of acid-proof tiles, with a capacity of 150,000 litres (33,000 gallons).

GERMAN CONSUMPTION OF SUPERPHOSPHATE has this year increased by 30 per cent. over its corresponding last year's level. Superphosphate shortage in fertilising local soils has been one of the outstanding deficiencies in German post-war crop culture, and doubtless is one important reason for the lower crop yields compared with pre-war, despite the higher consumption of potash and nitrogen fertilisers. Comparative figures of superphosphate consumption by Germany are as follows: 1913-14, 1,611,621 metric tons; 1923-24, 476,516 tons; 1927-28, 724,858 tons; 1928-29, 1,000,000 tons.

FRENCH PRODUCTION OF BONEBLACK is confined almost entirely to two firms, Etablissements Kuhlmann and the Usines de Nantes et de Nevers, with plants located at Corbie and the department of the Somme. The annual output averages approximately 70,000 to 80,000 metric quintals, about 90 per cent. of which is supplied by these two plants. Production is not, however, sufficient to fulfil requirements, as imports during 1928 aggregated a total of 78,715 metric quintals for a value of 35,446,000 francs, whereas exports for the same year were only 10,293 metric quintals, valued at 2,542,000 francs.

THE OFFICE OF WORKS, it is announced, has placed a large contract for Coalite solid smokeless fuel for use in Government departments. This fuel will be used mainly at the Admiralty and the War Office, which will thus set an example of smokeless chimneys to other public departments. The announcement of the Office of Works follows closely on the statement by Mr. George Lansbury, First Commissioner of Works, to a deputation from the Sunlight League, that if he had his way every public office would burn smokeless fuel. The subject will probably be discussed at the conference which is to be held at the Guildhall next week, by the Greater London Smoke Abatement Committee, to report on ways of applying the Public Health (Smoke Abatement) Act. The London County Council has had the County Hall converted into an entirely smokeless building. Open fire grates to burn smokeless fuel have been fitted, and the central heating boilers have been converted for the same purpose.

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# Patent Literature

*The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.*

## Abstracts of Complete Specifications

318,662–3–4. Aliphatic Anhydrides, Manufacture of. H. Dreyfus, Celanese House, Hanover Square, London, S.W.1. Application date, June 7, 1928.

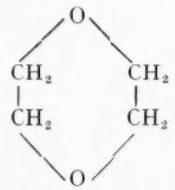
318,662. Aliphatic anhydrides, particularly acetic anhydride, are obtained by heating the vapour of the aliphatic acid in the presence of catalysts consisting of aliphatic acids which contain sulphonic acid or halogen substituents in the alkyl group or which are substituted by residues of phosphoric acids in their hydroxyl groups. Suitable catalysts include mono- or poly-chlor acetic acids, mono- or poly-brom-acetic acids, mono- or polychlor- or brom-propionic acids, sulphacetic acid, acetyl phosphoric acids, *e.g.*, diacetyl phosphoric acid. The temperature for the reaction is preferably 300°–700° C. The mixture of acetic acid and one or more of the above catalysts may be vaporised and passed through tubes heated to the required temperature. The tube may be made from, or lined with, copper, silica, fire-clay, etc., and may contain pieces of pumice, kieselguhr, carborundum, etc. The catalyst may be used in the proportion of 1–10 per cent. The reaction vapour may be subjected to fractional condensation to condense the anhydride, while the water remains in vapour form. Alternatively, the vapour may be passed through a solvent for the anhydride, which is insoluble in water and has a higher boiling point than water or the anhydride. The solvent is employed at temperatures intermediate between the boiling points of water and anhydride, so that the anhydride alone is condensed. Such solvents include chlorbenzene, paradichlor-benzene, benzyl ether, tetra-chlor-ethane, paraffin oil, triacetin, phenetol, anisol, cresols, and paracresyl acetate. In another alternative, the reaction products may be subjected to the process described in Specification No. 303,772 (see The Chemical Age, Vol. XX, p. 158), in which the anhydride is condensed while the water vapour is entrained by the vapour of another liquid such as toluol or xylene. Other processes may be used for separating the anhydride vapour such as that described in Specification No. 289,972 (see The Chemical Age, Vol. XVIII, p. 535) in which the vapour is passed over water-binding substances such as bisulphates, pyrosulphates, zinc chloride, phosphoric acids, etc.; also that described in Specification No. 310,863 (see The Chemical Age, Vol. XX, p. 546) in which the anhydride is absorbed in a flowing stream of benzene.

318,663. The process is similar to that described in Specification No. 318,662 above, but the catalysts employed are phenols and their alkacyl derivatives such as phenol, cresols, xylols, or acetyl derivatives of such phenols. The conditions of the process and the separation of the anhydride vapour are similar to those described above.

318,664. The process is similar to that described in Specification No. 318,662 above, except that the catalysts employed are polyhydroxy alcohols and their alkacyl derivatives, preferably glycerol or its mono- or poly-acetyl derivatives.

318,758. Homologues of Dioxane, Production of. J. Y. Johnson, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, September 24, 1928.

Homologues of dioxane



are obtained by treating mixtures of homologous glycols with catalysts having a dehydrating action, such as sulphuric acid, phosphoric acid, zinc chloride, sodium or potassium bisulphate, aromatic sulphonic acids, etc. The mixture of homologous glycols may be obtained by conversion of the olefines contained in gases evolved by cracking hydrocarbons, mineral oils, tar, etc. The glycols may also be employed in the form of mixtures of poly-glycols or ethers thereof and hydrocarbon radicles obtained as by-products in the production of glycols or their ethers. In an example, the mixture treated consists of ethylene glycol 60 per cent., 1 : 2-propylene-glycol 32 per cent., and 1 : 2-butylene-glycol 8 per cent., obtained from a gaseous mixture resulting from the cracking of brown coal tar oil and consisting of ethylene 30 per cent., propylene 14 per cent., butylene 3 per cent., and other gases and vapours 53 per cent. The product consists of a mixture of dioxane 60 per cent., dimethyl-dioxane 54 per cent., and diethyl dioxane 6 per cent., and this mixture boils between 95° and 150° C. The homologues of dioxane are employed as dispersing agents for fats, waxes, perfumes, etc.

318,717. Preservation of Rubber Latex. A. J. Somer, 12, Clarence Road, Mottingham, London, S.E.9, and A. B. R. Walker, Gulmarg, Langdon Hills, Essex. Application date, July 30, 1928.

Rubber latex has been preserved by strongly alkaline reagents such as ammonia, but this has an injurious effect when the rubber is subsequently subjected to electrolytic treatment. Further, the *p*H value of ammonia and caustic soda solutions is unnecessarily high. In this invention the preservatives employed are boron compounds which impart to the latex a *p*H value between 6 and 9·2. As an example, an addition of 2 per cent. by volume of sodium pentaborate may be used. This is non-volatile and requires less acid for neutralisation than ammonia. Alternatively, a mixture of borax and boric acid may be used as a preserving agent.

Note.—Abstracts of the following specifications which are now accepted, appeared in The Chemical Age when they became open to inspection under the International Convention: 294,486 (Soc. of Chemical Industry in Basle) relating to dyestuffs, see Vol. XIX, p. 297; 298,942 (Goodyear Tire and Rubber Co.) relating to vulcanized rubber, see Vol. XIX, p. 590; 303,742 (Soc. Anon des Distilleries de Deux-Sèvres relating to dehydration of aqueous formic acid, see Vol. XX, p. 259.

## International Specifications not yet Accepted

316,932. Vulcanization Accelerators. Rubber Service Laboratories Co., 335, South Main Street, Akron., Ohio, U.S.A. (Assignees of W. Scott, Nitro, W. Va., U.S.A.). International Convention date, August 6, 1928.

Vulcanization accelerators are obtained by treating 2 : 4-dinitro-chlorbenzene with mercapto-aryl-thiazoles, their alkalines, salts, etc., *e.g.*, the potassium salt of mercapto-benzothiazole. These products do not act at lower temperatures than that of vulcanization.

316,945. Hydrocarbons. Compagnie Générale des Produits de Synthèse, 40, Rue Louis Blanc, Paris. International Convention date, August 6, 1928.

Solid fuel is treated with air and steam in a producer to obtain carbon oxides and hydrogen. Methane and acetylene may then be added, and the mixture treated at 85° C. and atmospheric pressure with a catalyst consisting of sulphates of cerium and cobalt. This is obtained by dissolving calcined monazite in hydrochloric acid, separating the thorium, neutralizing with ammonia, adding nitric acid, evaporating to dryness, dissolving in sulphuric acid, adding cobalt sulphate, evaporating, dissolving in water and electrolysing. The cathode deposit is subjected to the action of X-rays for half an hour and may then be used as the catalyst. The products are 90 per cent. hydrocarbons and 10 per cent. oxygen-containing compounds, mainly ketones. A liquid fuel is obtained by cooling.

316,950. Dyes. I.G. Farbenindustrie Akt.-Ges.. Frankfort-on-Main, Germany. International Convention date, August 4, 1928.

The intermediate products of naphthazarin obtainable by suitable reduction of 1 : 8- or 1 : 5- dinitronaphthalene are

treated with an aliphatic aldehyde such as formaldehyde, acetaldehyde, or aldol. The products are used as dyestuffs, etc.

316,951. HYDROCARBONS AND PHENOLS. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, August 4, 1928.

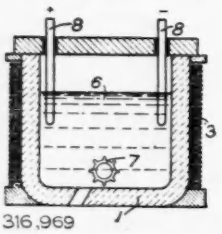
Aromatic and aliphatic compounds containing a double bond are condensed with olefines having at least three carbon atoms in the presence of hydrosilicates of aluminium or magnesium such as a bleaching earth, Florida earth and fuller's earth. Other condensing agents such as a metal halide or an addition compound of an olefine with an aluminium halide may be added. The process is applied to benzene and its homologues, polynuclear hydrocarbons such as naphthalene and anthracene, phenols, tetrahydro-naphthalene, olefines (polymerised), or products obtained in the refining of oils by the Edeleanu process. Any ethylene in the gases treated is not affected, and may thus be separated from the higher olefines by this method. In an example, propylene is passed under pressure into a hot solution of naphthalene in decahydronaphthalene or benzene containing bleaching earth or fuller's earth. Tetra-isopropylene-naphthalene and other products are obtained. Other examples are given of the treatment of propylene with *m*-cresol and with decahydronaphthalene.

316,966. BARIUM SULPHIDE. Kali-Chemie Akt.-Ges., 10, Reichstagsufer, Berlin. (Assignees of Rhenania-Kunheim Verein Chemischer Fabriken Akt.-Ges., 10, Reichstagsufer, Berlin). International Convention date, August 7, 1928.

Heavy spar is subjected to preliminary treatment to render it capable of agglomeration during reduction by carbon. It may be calcined at 600°-700° C. or ground to a grain size of 0·2 mm. or small amounts of acids, salts, etc., may be added.

316,969. ELECTROLYSIS. Hirsch Kupfer- und Messingwerke Akt.-Ges., Messingwerke, near Eberswald, Germany. International Convention date, August 7, 1928.

Substances 6 to be electrolysed are fused by heat generated in the electrodes 8 by induction due to current flowing in a



316,969

coil 3 surrounding the container. Conducting bodies 7 are moved by the electromagnetic forces to produce a stirring effect.

317,039. SULPHONATED ALÇOHOLS. H. T. Böhme Akt.-Ges., 29, Moritzstrasse, Chemnitz, Saxony, Germany. International Convention date, August 9, 1928. Addition to 308,824.

Alcohols derived from fats, *e.g.*, olein alcohol, are sulphonated with concentrated sulphuric acid or chlorsulphonic acid in the presence of anhydrous organic acids, anhydrides or chlorides. The products are stable to hard water, acids, and alkalies, and are used in the textile and leather industries.

317,040. SODIUM SULPHITE AND BISULPHITE. Zellstoffabrik, Waldhof, 156, Sandhofer Strasse, Waldhof, Mannheim, and O. Faust, 33, Carl Landenburgstrasse, Neuostheim, Mannheim, Germany. International Convention date, August 9, 1928.

Waste soda lye from artificial silk or paper making is treated with sulphur dioxide or sulphurous acid. Sodium sulphite or bisulphite is obtained.

317,079. AMINES. Compagnie de Produits Chimiques et Electro-Metallurgiques Alais, Froges et Camargue, 23, Rue Balzac, Paris. International Convention date, August 10, 1928.

A primary or secondary alcohol is heated with a primary amine or ammonia in the presence of nickel catalysts to obtain primary or secondary amines. Cyclohexylamine is obtained from cyclohexanol and ammonia, dicyclohexylamine from cyclohexylamine and cyclohexanol, and monoethyl-*p*-toluidine from *p*-toluidine and ethyl alcohol.

LATEST NOTIFICATIONS.

319,682. Manufacture of stable polymerisation products from vinyl esters. I.G. Farbenindustrie Akt.-Ges. September 26, 1928.

319,653. Feed apparatus for machines for depulping fibre-containing leaves. I.G. Farbenindustrie Akt.-Ges. September 25, 1928.

319,726. Method and apparatus for coating fabrics. Naugatuck Chemical Co. September 27, 1928.

319,727. Production of hypochlorite compositions. Mathieson Alkali Works. September 27, 1928.

319,656. Process for the production of chemically-pure phosphoric acid. I.G. Farbenindustrie Akt.-Ges. September 25, 1928.

319,657. Manufacture and production of valuable gases and the like. I.G. Farbenindustrie Akt.-Ges. September 25, 1928.

319,794. Process for the manufacture of heterocyclic compounds. I.G. Farbenindustrie Akt.-Ges. September 29, 1928.

## Specifications Accepted with Date of Application

289,412. Oxides of nitrogen, Process for absorbing. O. Y. Imray. (*Elektrizitätswerk Lonza.*) April 26, 1928.

296,999. Sulphonated derivatives of unsaturated fatty acids, Manufacture of. I.G. Farbenindustrie Akt.-Ges. September 10, 1927.

299,800. Molybdenum-bearing iron, Method of producing. Climax Molybdenum Co. November 1, 1927.

301,512. Removing halogen ions from metal salt solutions containing same as impurities, Process for. Metallges Akt.-Ges. December 1, 1927.

305,121. Nitrate of ammonia, Production of. Appareils et Evaporateurs Kestner. January 31, 1928.

305,132. Fertilisers, Manufacture of. Soc. l'Air l'Liquide, Soc. Anon. pour l'Etude et l'Exploitation des Procédés G. Claude, and E. Urbain. January 31, 1928.

305,528. Separation of organic liquids from mixtures containing same. Soc. Anon. des Distilleries des Deux-Sèvres. February 6, 1928.

305,578. Anhydrous aluminium chloride, Production of. I.G. Farbenindustrie Akt.-Ges. February 7, 1928.

308,751. Cast iron alloys. Climax Molybdenum Co. March 28, 1928.

319,224. Cracking oils, Method of. R. H. Crozier. May 18, 1928.

319,228. Calcium sulphate, Preparation of. P. Spence and Sons, Ltd., and S. F. W. Crundall. June 14, 1928.

319,251. Derivatives of urea and aldehydes, Manufacture of condensation products of. I.G. Farbenindustrie Akt.-Ges. May 7, 1928. Addition to 261,029.

319,296. Nitrated aromatic amino compounds, Manufacture of. British Celanese, Ltd., D. H. Mosby, H. C. Olpin, and G. H. Ellis. June 18, 1928.

319,308. Dyestuffs, Manufacture of. British Celanese, Ltd., D. H. Mosby, H. C. Olpin, and G. H. Ellis. June 18, 1928.

319,309. Treatment of materials for the concentration of iron contained therein. S. G. S. Dicker. (*Bradley-Fitch Co.*) June 19, 1928.

319,382. Coal gas, Purification of. Manchester Oxide Co., Ltd., and R. H. Clayton. May 23, 1928.

319,392. Manganese values from solutions containing manganese, Recovery of. S. G. S. Dicker. (*Bradley-Fitch Co.*) June 19, 1928.

319,396. Gas containing sulphuretted hydrogen, Purification of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) June 20, 1928.

319,407. Azo-dyestuffs, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) June 23, 1928.

319,433. Acetic acid, Production of. S. W. Rowell and Imperial Chemical Industries, Ltd. July 7, 1928.

319,441. Ammonium carbonate, Production of. W. Wilson. July 20, 1928.

319,542. Acetaldehyde from acetylene, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) December 3, 1928.

319,548. Nitric acid, Preparation of—by the catalytic combustion of ammonia with oxygen or gases rich in oxygen. I. W. Cederberg. December 11, 1928.

301,727. C. C-disubstituted barbituric acids and 1-phenyl-1-2 : 3-dimethyl-4-dialkylamino-5-pyrazolones, Process for the preparation of. Chemical Works (formerly Sandoz). December 3, 1927.

## Applications for Patents

Bleasdale, H. Manufacture of cellulose acetate. 30,287. October 5.

Bloxam, A. G., and Durand and Huguenin Akt.-Ges. Printing cellulose ester fabrics. 29,719. October 1.

—— and Soc. of Chemical Industry in Basle. Manufacture of chlorination products of isodibenzanthrone, etc. 30,014. October 3.

British Celanese, Ltd. Manufacture of artificial materials. 29,973. October 3.

—— Treatment of cellulose derivatives. 29,974. October 3.
—— Products from cellulose derivatives. 30,006. October 3.
Bronn, J. I., and Concordia-Bergbau Akt.-Ges. Manufacture of ammonium chloride. 30,197. October 4.
Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Immunising grain. 29,630. September 30.
—— Manufacture of fabrics containing effect threads. 29,631. September 30.
—— Manufacture of anthraquinone dyestuffs. 29,632. September 30.
—— Manufacture of anthraquinone dyestuffs. 29,749. October 1.
—— Manufacture of fast vat dyestuffs. 29,750. October 1.
—— Manufacture of lacquer coatings, films, etc. 29,751. October 1.
—— Manufacture of thio derivatives of phenols. 29,924. October 2.
—— Manufacture of thyroid gland preparations. 30,205. October 4.
—— Manufacture of ketone hydrazones of *m*- and *p*-phenylhydrazine sulphonic acids. 30,248. October 5.
Chemical Engineering and Wilton's Patent Furnace Co., Ltd. Treatment of ammoniacal liquor. 30,279. October 5.
Coley, H. E. Manufacture of metallic nitrides and ammonia from nitrogen. 30,155. October 4.
—— Manufacture of zinc. 30,156. October 4.
—— Manufacture of cyanides from nitrogen. 30,157.
—— Manufacture of alloys. 30,158. October 4.
—— Reduction of carbonates or bicarbonates. 30,159. October 4.
—— Reduction of sulphates. 30,160. October 4.
—— Extraction of gold from arsenical ores. 30,161. October 4.
Dean, H. P., and Imperial Chemical Industries, Ltd. Destructive hydrogenation. 30,106. October 4.
Distillers Co., Ltd., and Hutchinson, H. B. Production of aliphatic acids. 29,509. September 30.
Fawcett, H. W. Leaching substances in suspension in liquids. 30,123. October 4.
Feldman, E. D. Recovery of products from distillation of oil of turpentine, etc. 30,128. October 4.
Frank, A. R. Production of cyanamides. 29,701. October 1, (Germany, October 1, 1928.)
Goodfellow, B. R., and Patrick, L. Destructive hydrogenation. 30,107. October 4.
Groves, W. W., and I.G. Farbenindustrie Akt.-Ges. Manufacture of condensation products. 29,570. September 30.
—— Manufacture of preparations for productions of dyestuffs. 29,718. October 1.
I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Low-temperature carbonisation of fuels. 29,576. September 30.
—— Manufacture of vat dyestuffs. 29,577. September 30.
—— Manufacture of styrenes, etc. 29,578. September 30.
—— Manufacture of artificial masses. 29,859. October 2.
—— Manufacture of vat dyestuffs of the N-dihydro-1 : 2 : $2^1$ : $1^1$-anthraquinone-azine series. 29,860, 29,861. October 2.
—— Manufacture of motor fuels. 29,982. October 3.
—— Manufacture of mineral colours. 30,141. October 4.
—— Printing. 30,142. October 4.
—— Manufacture of thyroid gland preparations. 30,205. October 4.
—— Manufacture of ketone hydrazones of *m*- and *p*-phenylhydrazine sulphonic acids. 30,248. October 5.
—— Production of fuel gases. 30,253. October 5.
I.G. Farbenindustrie Akt.-Ges. Suppressing phosgene-formation when extinguishing fires. 29,618. September 30. (Germany, October 11, 1928.)
—— Manufacture of cement powders, etc. 29,863. October 2. (Germany, October 2, 1928.)
—— Manufacture of artificial threads. 29,864. October 2. (Germany, October 5, 1928.)
—— Manufacture of artificial threads. 30,001. October 3. (Germany, October 5, 1928.)
—— Manufacture of vat dyestuffs of the benzanthrone series. 30,140. October 4. (Germany, October 26, 1928.)
—— Kinematograph projectors. 30,143. October 4. (Germany, December 21, 1928.)
Imperial Chemical Industries, Ltd., Tatum, W. W., and Piggott, H. A. Preparation of dyestuffs of anthraquinone series. 29,549. September 30.
Imperial Chemical Industries, Ltd. Manufacture of conversion products of rubber. 29,550. September 30.
Imperial Chemical Industries, Ltd., Saunders, K. H., and Stubbings, W. V. Manufacture of β-naphthylamine. 29,551. September 30.
Imperial Chemical Industries, Ltd. Manufacture of ethyl cellulose. 29,686. October 1.
—— Production of mixed fertilisers. 29,802. October 2.
—— Dyeing regenerated cellulose artificial silk. 29,907. October 2. (September 12, 1928.)
—— Manufacture of hydrogen from methane. 29,993, 29,994. October 3.
Klavehn, W., and Knoll Akt.-Ges. Chemische Fabriken. Manufacture of 1-phenyl-2-methylamino-1-propanol. 30,144. October 4. (Germany, July 30.)
Minerals Separation, Ltd. Froth-flotation concentration of minerals. 29,905. October 2.
Soc. of Chemical Industry in Basle. Manufacture of chlorination products of isodibenzanthrone, etc. 30,014. October 3.
Tyrer, D. Manufacture of hydrogen from methane. 29,993, 29,994. October 3.

## Physical and Optical Societies

### Arrangements for Annual Exhibition

THE twentieth annual exhibition of electrical, optical and other physical apparatus is to be held by the Physical Society and the Optical Society on January 7, 8 and 9, 1930, at the Imperial College of Science and Technology, South Kensington. As on previous occasions, there will be a trade section and a research and experimental section, and, in addition, a new section for the work of apprentices and learners.

The Trade Section will comprise the exhibits of manufacturing firms, and preliminary invitations to these exhibitors have already been issued, entries being asked for by October 18.

The Research and Experimental Section will be arranged in three groups : (*a*) Exhibits illustrating the results of recent physical research ; (*b*) lecture experiments in physics ; (*c*) historical exhibits in physics.

The Exhibition Committee invites offers from research laboratories and institutions and from individual research workers, of exhibits suitable for inclusion in any of the above three groups. Accommodation for these exhibits will be provided in rooms separate from those devoted to the trade exhibits, and a part of the catalogue will be devoted to their description. No charge will be made for space or catalogue entries in the Research and Experimental Section. Offers of exhibits, giving particulars of space and other facilities required, should be communicated immediately, and in any case not later than October 30, to the Secretary, Exhibition Committee, 1, Lowther Gardens, Exhibition Road, London, S.W.7.

The Section for Apprentices and Learners has been instituted with the object of encouraging craftsmanship in the scientific instrument trade. Apprentices and learners may exhibit, in competition, specimens of their work, providing they are in the regular employ of a firm which subscribes to the prize fund and exhibits at the next Annual Exhibition, or has exhibited once during the past three years. Printed particulars of this new section will be sent on application to the secretary.

## Conveyance of Anæsthetic Gases

### Interesting New System at St. Bartholomew's Hospital

A CENTRAL anæsthetising plant which is to be installed in the new surgical block being erected at St. Bartholomew's Hospital will be the first of its kind in this country. Similar systems are in operation in some hospitals in the United States. The plant will be erected in the basement of the surgical block, the complete cost of which is expected to exceed £200,000. This new building will have 250 beds on five floors, on each of which will be two wards and one operating theatre. From ten cylinders of hardened steel, pipes will carry the oxygen and nitrous oxide used in operations to the various theatres. This method will be a great saving of time and labour on the system in operation at the present time, for the cylinders of gas, each weighing 16 lb., have now to be carried to the operating theatres, and four out of five of these are on the top floor of the hospital. Some idea of the task thus involved is indicated by the fact that over 20,000 gallons of gas is used by the anæsthetists every week.

By means of the new arrangement the anæsthetist can obtain the supplies of oxygen and nitrous oxide he requires by merely regulating taps, which convey them through a mixing chamber filled with ether, and adjusting these components in their proper proportions.

When the surgical block is in use early next year all the surgical operations carried out in the hospital will, of course, take place there ; only the special cases, as distinct from surgical, will be operated on in the old building. Consequently, most of the anæsthetical work will be assisted by the new installation. At the present time about 300 anæsthetic administrations are given every week.

# Weekly Prices of British Chemical Products

*The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.*

## General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.

ACID BORIC, COMMERCIAL.—Crystal, £20 per ton; powder, £21 per ton; extra fine powder, £23 per ton. Packed in 2 cwt. bags carriage paid any station in Great Britain.

ACID HYDROCHLORIC.—3s. 9d. to 6s. per carboy d/d, according to purity, strength and locality.

ACID NITRIC, 80° TW.—£21 10s. to £27 per ton, makers' works according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA ALKALI.—£6 15s. per ton f.o.r. Special terms for contracts.

BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.

BLEACHING POWDER.—Spot, £9 10s. per ton d/d; Contract, £8 10s. per ton d/d, 4-ton lots.

BORAX, COMMERCIAL.—Crystals, £19 10s. to £20 per ton; granulated, £12 10s. per ton; powder, £14 per ton. (Packed in 1 cwt. bags carriage paid any station in Great Britain.)

CALCIUM CHLORIDE (SOLID).—£5 to £5 5s. per ton d/d carr. paid.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 3d. to 1s. 8d. per gall. pyridinised industrial, 1s. 5d. to 1s. 10d. per gall.; mineralised 2s. 4d. to 2s. 8d. per gall.; 64 O.P., 1d. extra in all cases.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE.—4½d. per lb.

POTASSIUM CHLORATE.—3¾d. per lb., ex-wharf, London, in cwt. kegs.

SALAMMONIAC.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE.—£3 15s. to £4 per ton d/d. In bulk.

SODA CAUSTIC, SOLID.—Spot lots delivered, £15 2s. 6d. to £18 per ton, according to strength; 20s. less for contracts.

SODA CRYSTALS.—£5 to £5 5s. per ton, ex railway depots or ports.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE.—£10 10s. per ton, carr. paid.

SODIUM BICHROMATE.—3½d. per lb.

SODIUM BISULPHITE POWDER, 60/62%.—£17 10s. per ton delivered for home market, 1-cwt. drums included; £15 10s. f.o.r. London.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM NITRITE, 100% BASIS.—£27 per ton d/d.

SODIUM PHOSPHATE.—£14 per ton, f.o.b. London, casks free.

SODIUM SULPHATE (GLAUBER SALTS).—£3 12s. 6d. per ton.

SODIUM SULPHIDE CONC. SOLID, 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. paid.

SODIUM SULPHIDE CRYSTALS.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. paid.

SODIUM SULPHITE, PEA CRYSTALS.—£14 per ton f.o.b. London, 1-cwt. kegs included.

## Coal Tar Products

ACID CARBOLIC CRYSTALS.—7d. to 9¾d. per lb. Crude 60's, 2s. 3½d. to 2s. 5d. per gall.

ACID CRESYLIC 99/100.—2s. 2d. to 2s. 7d. per gall. Pure, 5s. to 5s. 3d. per gall. 97/99.—2s. 1d. to 2s. 2d. per gall. Pale, 95%, 1s. 9d. to 1s. 10d. per gall. 98%, 2s 1d. to 2s. 4d. Dark, 1s. 6d. to 1s. 10d. Refined, 2s. 7d. to 2s. 9d. per gall.

ANTHRACENE.—A quality, 2d. to 2½d. per unit. 40%, £4 10s. per ton.

ANTHRACENE OIL, STRAINED, 1080/1090.—4¾d. to 5½d. per gall. 1100, 5½d. to 6d. per gall.; 1110, 6d. to 6½d. per gall. Unstrained (Prices only nominal).

BENZOLE.—Prices at works: Crude, 10d. to 11d. per gall.; Standard Motor, 1s. 5d. to 1s. 6d. per gall.; 90%, 1s. 7d. to 1s. 8d. per gall; Pure, 1s. 10d. to 1s. 11d. per gall.

TOLUOLE.—90%, 1s. 9d. to 2s. 1d. per gall. Firm. Pure, 1s. 11d. to 2s. 4d. per gall.

XYLOL.—1s. 5d. to 1s. 10d. per gall. Pure, 1s. 8d. to 2s. 1d. per gall.

CREOSOTE.—Cresylic, 20/24%, 6¾d. to 7d. per gall.; Heavy, 6¼d to 6¾d. per gall. Middle oil, 4½d. to 5d. per gall. Standard specification, 3d. to 4d. per gall. Light gravity, 2d. to 2¼d. per gall. ex works. Salty, 7½d. per gall.

NAPHTHA.—Crude, 8¼d. to 8¾d. per gall. Solvent, 90/160, 1s. 3d. to 1s. 3½d. per gall. Solvent, 95/160, 1s. 4d. to 1s. 5d. per gall. Solvent 90/190, 1s. to 1s. 3d. per gall.

NAPHTHALENE, CRUDE.—Drained Creosote Salts, £4 10s. to £5 per ton. Whizzed, £5 per ton. Hot pressed, £8 10s. per ton.

NAPHTHALENE.—Crystals, £12 5s. per ton. Purified Crystals, £14 10s. per ton. Quiet Flaked, £14 to £15 per ton, according to districts.

PITCH.—Medium soft, 47s. 6d. per ton, f.o.b., according to district. Nominal.

PYRIDINE.—90/140, 3s. 9d. to 4s. per gall. 90/160, 3s. 6d. to 3s. 9d. per gall. 90/180, 1s. 9d. to 2s. 3d. per gall. Heavy, prices only nominal.

## Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—6s. per lb. 100%.

ACID BENZOIC.—1s. 8½d. per lb.

ACID GAMMA.—4s. 6d. per lb.

ACID H.—3s. per lb.

ACID NAPHTHIONIC.—1s. 6d. per lb.

ACID NEVILLE AND WINTHER.—4s. 9d. per lb.

ACID SULPHANILIC.—8½d. per lb.

ANILINE OIL.—8d. per lb. naked at works.

ANILINE SALTS.—8d. per lb. naked at works.

BENZALDEHYDE.—2s. 3d. per lb.

BENZIDINE BASE.—3s. 3d. per lb. 100% basis d/d.

BENZOIC ACID.—1s. 8½d. per lb.

*o*-CRESOL 29/31° C.—£2 18s. 4d. to £3 9s. 4d. per cwt.

*m*-CRESOL 98/100%.—2s. 9d. per lb., in ton lots d/d.

*p*-CRESOL 32/34° C.—1s. 11d. per lb., in ton lots d/d.

DICHLORANILINE.—1s. 10d. per lb.

DIMETHYLANILINE.—1s. 11d. per lb.

DINITROBENZENE.—8d. per lb. naked at works. £75 per ton.

DINITROCHLORBENZENE.—£84 per ton d/d.

DINITROTOLUENE.—48/50° C. 7½d. per lb. naked at works. 66/68° C, 9d. per lb. naked at works.

DIPHENYLAMINE.—2s. 10d. per lb. d/d.

*a*-NAPHTHOL.—2s. per lb. d/d.

*B*-NAPHTHOL.—10d. per lb. d/d.

*a*-NAPHTHYLAMINE.—1s. 3d. per lb.

*B*-NAPHTHYLAMINE.—3s. per lb.

*o*-NITRANILINE.—5s. 9d. per lb.

*m*-NITRANILINE.—3s. per lb. d/d.

*p*-NITRANILINE.—1s. 8d. per lb.

NITROBENZENE.—6d. per lb. naked at works.

NITRONAPHTHALENE.—1s. 3d. per lb.

R. SALT.—2s. 2d. per lb.

SODIUM NAPHTHIONATE.—1s. 8½d. per lb. 100% basis d/d.

*o*-TOLUIDINE.—8d. per lb.

*p*-TOLUIDINE.—1s. 9d. per lb. naked at works.

*m*-XYLIDINE ACETATE.—2s. 6d. per lb. 100%.

N. W. ACID.—4s. 9d. per lb. 100%.

## Wood Distillation Products

ACETATE OF LIME.—Brown, £9 15s. to £10 5s. per ton. Grey, £16 10s. to £17 10s. per ton. Liquor, 9d. per gall.

ACETONE.—£78 per ton.

CHARCOAL.—£6 to £8 10s. per ton, according to grade and locality.

IRON LIQUOR.—1s. 3d. per gall, 32° Tw. 1s. per gall. 24° Tw.

RED LIQUOR.—9d. to 10½d. per gall. 16° Tw.

WOOD CRESOTE.—1s. 9d. per gall. Unrefined.

WOOD NAPHTHA, MISCIBLE.—3s. 8d. to 3s. 11d. per gall. Solvent, 4s. to 4s. 3d. per gall.

WOOD TAR.—£3 10s. to £4 10s. per ton.

BROWN SUGAR OF LEAD.—£38 per ton.

## Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 3d. per lb. according to quality; Crimson, 1s. 4d. to 1s. 6d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—1s. 10d. to 2s. per lb.

BARYTES.—£5 10s. to £7 per ton, according to quality.

CADMIUM SULPHIDE.—5s. to 6s. per lb.

CARBON BISULPHIDE.—£25 to £27 10s. per ton, according to quantity

CARBON BLACK.—5½d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£40 to £50 per ton, according to quantity, drums extra.

CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.

DIPHENYLGUANIDINE.—3s. 9d. per lb.

INDIARUBBER SUBSTITUTES, WHITE AND DARK.—4⅝d. to 5¼d. per lb.

LAMP BLACK.—£30 per ton, barrels free.

LEAD HYPOSULPHITE.—9d. per lb.

LITHOPONE, 30%.—£20 to £22 per ton.

MINERAL RUBBER "RUBPRON."—£13 12s. 6d. per ton, f.o.r. London

SULPHUR.—£10 to £13 per ton, according to quality.

SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra

SULPHUR PRECIP. B. P.—£55 to £60 per ton.

THIOCARBAMIDE.—2s. 6d. to 2s. 9d. per lb., carriage paid.

THIOCARBANILIDE.—2s. 1d. to 2s. 3d. per lb.

VERMILION, PALE OR DEEP.—6s. 6d. to 6s. 9d. per lb.

ZINC SULPHIDE.—8d. to 11d. per lb.

## Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£37 per ton ex wharf London, barrels free.

ACID, ACETYL SALICYLIC.—2s. 10d. to 2s. 10½d. per lb., according to quantity.

ACID, BENZOIC, B.P.—2s. to 3s. 3d. per lb., according to quantity. Solely ex Gum, 1s. 6d. per oz.; 50-oz. lots, 1s. 3d. per oz.

ACID, BORIC B.P.—Crystal, £32 per ton; powder, £36 per ton; extra fine powder, £38 per ton. Packed in 2-cwt. bags carriage paid any station in Great Britain.

ACID, CAMPHORIC.—19s. to 21s. per lb.

ACID, CITRIC.—2s. 0½d. to 2s. 1d. per lb., less 5%.

ACID, GALLIC.—2s. 8d. per lb. for pure crystal, in cwt. lots.

ACID, MOLYBDIC.—5s. 3d. per lb. in ¼ cwt. lots. Packages extra. Special prices for quantities and contracts.

ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d.

ACID, SALICYLIC, B.P. PULV.—1s. 5½d. to 1s. 7d. per lb. Technical.—10½d. to 1s. 2d. per lb.

ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.

ACID, TARTARIC.—1s. 5d. per lb., less 5%.

ACETANILIDE.—1s. 5d. to 1s. 8d. per lb. for quantities.

AMIDOL.—7s. 6d. to 9s. per lb., d/d.

AMIDOPYRIN.—7s. 9d. to 8s. per lb.

AMMONIUM BENZOATE.—3s. 3d. to 3s. 9d. per lb., according to quantity. 18s. per lb. ex Gum.

AMMONIUM CARBONATE B.P.—£36 per ton. Powder, £39 per ton in 5 cwt. casks. Resublimated, 1s. per lb.

AMMONIUM MOLYBDATE.—4s. 9d. per lb. in ¼ cwt. lots. Packages extra. Special prices for quantities and contracts.

ATROPHINE SULPHATE.—9s. per oz.

BARBITONE.—5s. 9d. to 6s. per lb.

BENZONAPHTHOL.—3s. to 3s. 3d. per lb. spot.

BISMUTH CARBONATE.—8s. 9d. per lb.

BISMUTH CITRATE.—8s. 3d. per lb.

BISMUTH SALICYLATE.—8s. 3d. per lb.

BISMUTH SUBNITRATE.—7s. 6d. per lb.

BISMUTH NITRATE.—Cryst. 5s. 3d. per lb.

BISMUTH OXIDE.—11s. 3d. per lb.

BISMUTH SUBCHLORIDE.—10s. 3d. per lb.

BISMUTH SUBGALLATE.—7s. 3d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth salts respectively.

BISMUTHI ET AMMON LIQUOR.—Cit. B.P. in W. Qts. 1s. 0½d. per lb.; 12 W. Qts. 11½d. per lb.; 36 W Qts. 11d. per lb.

BORAX B.P.—Crystal, £20 per ton; powder, £21 per ton. Packed in 1- or 2-cwt. bags carriage paid any station in Great Britain.

BROMIDES.—Ammonium, 1s. 11½d. per lb.; potassium, 1s. 8½d. per lb.; granular, 1s. 7½d. per lb.; sodium, 1s. 10½d. per lb. Prices for 1 cwt. lots.

CALCIUM LACTATE.—B.P., 1s. 2d. to 1s. 3d per lb., in 1-cwt. lots.

CAMPHOR.—Refined flowers, 3s. 3d. to 3s. 4d. per lb., according to quantity; also special contract prices.

CHLORAL HYDRATE.—3s. 1d. to 3s. 4d. per lb.

CHLOROFORM.—2s. 4½d. to 2s. 7½d. per lb., according to quantity.

CREOSOTE CARBONATE.—6s. per lb.

ETHERS.—S.G. ·730—11d. to 1s. per lb., according to quantity other gravities at proportionate prices.

FORMALDEHYDE, 40%.—37s. per cwt., in barrels, ex wharf.

GUAIACOL CARBONATE.—4s. 6d. to 4s. 9d. per lb.

HEXAMINE.—2s. 3d. to 2s. 6d. per lb.

HOMATROPINE HYDROBROMIDE.—30s. per oz.

HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.

HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. Winchesters, 2s. 11d. per gall. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 4s. per gall.

HYDROQUINONE.—3s. 9d. to 4s. per lb., in cwt. lots.

HYPOPHOSPHITES.—Calcium, 2s. 5d. per lb.; potassium, 2s. 8½d. per lb.; sodium, 2s. 7½d. per lb., in 1 cwt. lots, assorted.

IRON AMMONIUM CITRATE.—B.P., 2s. 8d. to 2s. 11d. per lb. Green, 3s. 1d. to 3s. 4d. per lb. U.S.P., 2s. 9d. to 3s. per lb.

IRON PERCHLORIDE.—18s. to 20s. per cwt., according to quantity.

IRON QUININE CITRATE.—B.P., 8¾d. to 9¼d. per oz., according to quantity.

MAGNESIUM CARBONATE.—Light commercial, £31 per ton net.

MAGNESIUM OXIDE.—Light commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.

MENTHOL.—A.B.R. recrystallised B.P., 19s. per lb. net; Synthetic, 10s. 6d. to 12s. per lb.; Synthetic detached crystals 10s. 6d. to 16s. per lb., according to quantity; Liquid (95%), 9s. per lb.

MERCURIALS B.P.—Up to 1 cwt. lots, Red Oxide, crystals, 8s. 4d. to 8s. 5d. per lb., levig., 7s. 10d. to 7s. 11d. per lb.; Corrosive Sublimate, Lump, 6s. 7d. to 6s. 8d. per lb., Powder, 6s. to 6s. 1d. per lb.; White Precipitate, Lump, 6s. 9d. to 6s. 10d. per lb., Powder, 6s. 10d. to 6s. 11d. per lb., Extra Fine, 6s. 11d. to 7s. per lb.; Calomel, 7s. 2d. to 7s. 3d. per lb.; Yellow Oxide, 7s. 8d. to 7s. 9d. per lb.; Persulph, B.P.C., 6s. 11d. to 7s. per lb.; Sulph. nig., 6s. 8d. to 6s. 9d. per lb. Special prices for larger quantities.

METHYL SALICYLATE.—1s. 6d. to 1s. 8d. per lb.

METHYL SULPHONAL.—18s. 6d. to 20s. per lb.

METOL.—9s. to 11s. 6d. per lb. British make.

PARAFORMALDEHYDE.—1s. 9d. per lb. for 100% powder.

PARALDEHYDE.—1s. 4d. per lb.

PHENACETIN.—3s. 2½d. per lb.

PHENAZONE.—5s. 11d. to 6s. 1½d. per lb.

PHENOLPHTHALEIN.—5s. 11d. to 6s. 1½d. per lb.

POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—102s. to 104s. per cwt., less 2½ per cent.

POTASSIUM CITRATE.—B.P.C., 2s. 7d. per lb. in 1 cwt. lots.

POTASSIUM FERRICYANIDE.—1s. 9d. per lb., in cwt. lots.

POTASSIUM IODIDE.—16s. 8d. to 17s. 2d. per lb., according to quantity.

POTASSIUM METABISULPHITE.—6d. per lb., 1-cwt. kegs included f.o.r. London.

POTASSIUM PERMANGANATE.—B.P. crystals, 5½d. per lb., spot.

QUININE SULPHATE.—1s. 8d. to 1s. 9d. per oz., bulk in 100 oz. tins.

RESORCIN.—2s. 10d. to 3s. per lb., spot.

SACCHARIN.—43s. 6d. per lb.

SALOL.—2s. 3d. to 2s. 6d. per lb.

SODIUM BENZOATE, B.P.—1s. 8d. to 1s. 11d. per lb.

SODIUM CITRATE, B.P.C., 1911.—2s. 4d. per lb., B.P.C. 1923—2s. 7d. per lb. Prices for 1 cwt. lots. U.S.P., 2s. 6d. to 2s. 9d. per lb., according to quantity.

SODIUM FERROCYANIDE.—4d. per lb., carriage paid.

SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.

SODIUM NITROPRUSSIDE.—16s. per lb.

SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—100s. to 105s. per cwt. Crystals, 5s. per cwt. extra.

SODIUM SALICYLATE.—Powder, 2s. 2d. to 2s. 4d. per lb. Crystal, 2s. 3d. to 2s. 5d. per lb.

SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 1d. per lb.

SODIUM SULPHITE, ANHYDROUS.—£27 10s. to £29 10s. per ton, according to quantity. Delivered U.K.

SULPHONAL.—9s. 6d. to 10s. per lb.

TARTAR EMETIC, B.P.—Crystal or powder, 2s. 1d. to 2s. 3d. per lb.

THYMOL.—Puriss., 9s. 1d. to 9s. 4d. per lb., according to quantity. Firmer. Natural, 12s. per lb.

## Perfumery Chemicals

ACETOPHENONE.—7s. per lb.

AUBEPINE (EX ANETHOL).—12s. per lb.

AMYL ACETATE.—2s. 6d. per lb.

AMYL BUTYRATE.—5s. per lb.

AMYL CINNAMIC ALDEHYDE.—17s. per lb.

AMYL SALICYLATE.—2s. 9d. per lb.

ANETHOL (M.P. 21/22° C.).—6s. 6d. per lb.

BENZALDEHYDE FREE FROM CHLORINE.—2s. 3d. per lb.

BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—1s. 10d. per lb.

BENZYL ALCOHOL FREE FROM CHLORINE.—1s. 10d. per lb.

BENZYL BENZOATE.—2s. 3d. per lb.

CINNAMIC ALDEHYDE NATURAL.—13s. 3d. per lb.

COUMARIN.—8s. 9d. per lb.

CITRONELLOL.—9s. per lb.

CITRAL.—8s. per lb.

ETHYL CINNAMATE.—6s. 6d. per lb.

ETHYL PHTHALATE.—3s. per lb.

EUGENOL.—11s. 9d. per lb.

GERANIOL (PALMAROSA).—21s. per lb.

GERANIOL.—6s. 6d. to 10s. per lb.

HELIOTROPINE.—7s. per lb.

ISO EUGENOL.—13s. 9d. per lb.

LINALOL.—Ex Bois de Rose, 12s. 6d. per lb. Ex Shui Oil, 10s. per lb.

LINALYL ACETATE.—Ex Bois de Rose, 16s. per lb. Ex Shui Oil, 12s. per lb.

PHENYL ETHYL ACETATE.—11s. per lb.

PHENYL ETHYL ALCOHOL.—10s. per lb.

RHODINOL.—56s. per lb.

SAFROL.—2s. 6d. per lb.

TERPINEOL.—1s. 6d. per lb.

VANILLIN, EX CLOVE OIL.—15s. to 17s. 6d. per lb. Ex Guaiacol 14s. to 15s. 6d. per lb.

## Essential Oils

ALMOND OIL.—Foreign S.P.A., 10s. per lb.

ANISE OIL.—4s. per lb.

BERGAMOT OIL.—15s. 3d. per lb.

BOURBON GERANIUM OIL.—21s. per lb.

CANANGA OIL, JAVA.—11s. 6d. per lb.

CASSIA OIL, 80/85%.—5s. 6d. per lb.

CINNAMON OIL LEAF.—8s. per oz.

CITRONELLA OIL.—Java, 2s. 10d. per lb., c.i.f. U.K. port. Ceylon, pure, 2s. 4d. per lb.

CLOVE OIL (90/92%).—8s. 3d. per lb.

EUCALYPTUS OIL, AUSTRALIAN, B.P. 70/75%.—1s. 10d. per lb.

LAVENDER OIL.—Mont Blanc, 38/40%, 15s. 3d. per lb.

LEMON OIL.—14s. 6d. per lb.

LEMONGRASS OIL.—4s. per lb.

# London Chemical Market

*The following notes on the London Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

*London, October 10, 1929.*

STEADY conditions are to be reported in most products, the demand showing signs of expansion. Prices continue firm. Export trade is improving, the inquiries being more numerous.

## General Chemicals

ACETONE.—Unchanged at the firm rates of £75 to £85 per ton, with a steady demand.

ACID ACETIC.—There is a steady consumption with prices unaltered at £36 10s. for 80% technical, with the usual extra for edible quality.

ACID CITRIC.—The demand is rather slack, and prices are firm at about 2s. 3d. less 5%, with small parcels offering.

ACID LACTIC.—£43 per ton is quoted for 50% weight, with a steady demand.

ACID OXALIC.—Rather more inquiry is being received, with the market unchanged at £30 7s. 6d. to £32 per ton, according to quantity.

ACID TARTARIC.—In small request, and price is steady at about 1s. 5d., less 5%.

ALUMINA SULPHATE.—Rather more inquiry is being received. Price is firm at £7 15s. to £8.

ARSENIC.—In small demand at £16 7s. 6d., free on rails mines.

BORAX.—Higher prices are being quoted, with the demand fair.

CREAM OF TARTAR is in steady request at the firm rates of £104 to £109 per ton.

COPPER SULPHATE.—There is an improvement in the demand, and prices are firm at £28 per ton.

FORMALDEHYDE.—A brisk trade is passing, with the market steady at £36 per ton.

LEAD ACETATE.—In fair demand at £44 per ton for white and £1 per ton less for brown. The market is firm.

LEAD NITRATE.—Unchanged at £33 15s., and in steady request.

LIME ACETATE.—Rather slow at £18 per ton.

LITHOPONE.—Demand continues steady at £19 15s. to £23 per ton according to grade.

METHYL ACETONE is fairly active at the unchanged rate of £58 10s. per ton.

POTASSIUM CARBONATE.—Steady with 96/98% quoted at about £27 per ton.

POTASSIUM CHLORATE.—Demand is improving, and price continues firm at £30 per ton.

POTASSIUM PERMANGANATE.—More inquiry has been received, and the market is firm at 5½d. to 5¾d. per lb.

POTASSIUM PRUSSIATE has been in better demand at £63 10s. to £65 10s. per ton, and the position is firm.

SODIUM ACETATE.—The price for standard white crystal quality is firm at £22 to £23 per ton, with a fair demand.

SODIUM BICHROMATE.—In steady demand at 3⅝d. per lb.

SODIUM HYPO, PHOTOGRAPHIC QUALITY.—The demand is not so active, and price is unchanged at £14 10s. to £15 per ton. The commercial quality is in better request at £8 10s. to £9 per ton.

SODIUM NITRITE.—There is an improved demand, with the market steady at £20 per ton.

SODIUM PHOSPHATE.—The demand is on the increase, with dibasic quoted at £12 per ton and tribasic at £17 per ton.

SODIUM PRUSSIATE.—The firm rates of 4¾d. to 5½d. per lb. are unchanged, with the product in good request.

TARTAR EMETIC.—In active demand at 11½d.

ZINC SULPHATE.—More business is passing at £13 10s. per ton, at which price the market continues firm.

## Coal Tar Products

There is no change to report in the market for coal tar products from last week.

MOTOR BENZOL is unchanged at about 1s. 5½d. to 1s. 6d. per gallon, f.o.r. markers' works.

SOLVENT NAPHTHA remains at about 1s. 2½d. to 1s. 3d. per gallon, f.o.r.

HEAVY NAPHTHA is quoted at about 1s. 1d. per gallon, f.o.r.

CREOSOTE OIL remains at 3½d. to 4d. per gallon on rails in the North, and at 4¾d. per gallon in London.

NAPHTHALENES remain at about £4 10s. per ton for the firelighter quality, at £5 per ton for the 74/76 quality, and at £6 to £6 5s. per ton for the 76/78 quality.

PITCH is firm, at 45s. to 47s. 6d. per ton, f.o.b. East Coast Port.

## Nitrogen Products

*Sulphate of Ammonia.*—The market remains unchanged at £8 18s. 9d. per ton f.o.b. U.K. port, in single bags, for neutral quality, basis 20·60 per cent. nitrogen. Some low grade continental sulphate of ammonia has been offered at slightly lower prices. On the Continent buyers are tending to hold off, but shipments to more distant markets continue on a satisfactory scale.

*Home.*—The announcement of prices up to the end of the year has stimulated interest, but as is usual in the autumn, sales for immediate consumption are small.

*Nitrate of Soda.*—There is no change to report.

## Latest Oil Prices

LONDON, October 9.—LINSEED OIL was firm, and 10s. to 7s. 6d. per ton higher. Spot, ex mill, £45 10s.; October, £43 15s.; November-December, £43 7s. 6d.; and January-April, £42, naked. RAPE OIL was inactive. Crude, extracted, £44; technical refined, £45 10s., naked, ex wharf. COTTON OIL was quiet. Egyptian crude, £35; refined common edible, £38; and deodorised, £40, naked, ex mill. TURPENTINE was quiet. American, spot, 45s.; November-December, 45s. 3d.; and January-April, 46s. 9d. per cwt.

HULL.—LINSEED OIL.—Spot, £44 10s.; October and November-December, £44 7s. 6d.; January-April, £43 5s. per ton, naked. COTTON OIL.—Egyptian crude, spot, £34 5s.; November-December, (new), £31 15s.; edible refined, spot, £38 5s.; technical, spot, £38; deodorised, spot, £40 5s. per ton, naked. PALM KERNEL OIL.—Crude 5¼ per cent., spot, £34 per ton, naked. GROUNDNUT OIL.—Crushed/Extracted, spot, £38 10s.; deodorised, £42 10s. per ton. SOYA OIL.—Extracted and crushed, spot, £35; deodorised, spot, £38 10s. per ton. RAPE OIL.—Crushed/Extracted, spot, £43 10s.; refined, spot, £45 10s. per ton, net cash terms, ex mill. TURPENTINE, CASTOR OIL, and COD OIL unchanged.

## South Wales By-Products

THERE is slightly more activity in South Wales by-products. Pitch is in better demand, with values unaltered at 50s. to 55s. per ton delivered. Road tar is also brighter, with values on a basis of 10s. 6d. to 13s. per 40-gallon barrel. Crude tar maintains its slight advance to 27s. per ton, f.o.r. makers' works, and has a steady, if moderate, call. Whizzed naphthalene, quoted at 80s. per ton, is slow, and a similar remark applies to crude at 70s. per ton, both prices f.o.r. maker's works. Creosote remains weak, with quotations unchanged at 3½d. to 4½d. per gallon. Motor benzol is unaltered at 1s. 3½d. to 1s. 6d. per gallon. Solvent naphtha, quoted at 1s. 3d. to 1s. 5d. per gallon, has a small demand. Refined tars are unchanged, demand being fair and quotations unaltered. Patent fuel and coke exports are expected to improve now that the Baltic trade is over. Patent fuel quotations are :—Ex-ship Cardiff, 22s.; ex-ship Swansea, 20s.; and ex-ship Newport, 20s. 6d. per ton. Coke quotations are :—Best foundry, 35s. to 37s.; good foundry, 30s. to 35s.; and furnace from 29s. to 30s. per ton. Oil imports over the last four ascertainable weeks amounted to 7,170,900 gallons, all from Persia.

## Vanillin-Monsanto: Price Reduction

THE present position of the clove market enables Graesser-Monsanto Chemical Works, Ltd., to announce a reduction in the price of Vanillin-Monsanto on and from October 9: 1 ton, 13s. per lb.; ¼ ton, 13s. 6d. per lb.; 5 cwt., 13s. 9d. per lb.; 1 cwt., 14s. per lb.; 28 lb., 14s. 3d. per lb.; less, 14s. 6d., for contracts delivered within 12 months. Vanillin-Monsanto is British-made from selected clove oil, and is 100% pure. It is guaranteed to comply with the Food and Drugs Act, and all other statutory requirements or regulations relating to the sale of food.

## Production of Aluminium Sulphate in Mexico

THE principal, and almost sole, Mexican cosumers of industrial aluminium sulphate are the paper mills. It is used to a slight extent in dressing leather, dyeing, and sizing, but very little is used for water clarification. A year or two ago all industrial needs for this product were supplied by importation from Germany, France, Sweden, and the United States. The Cia Manufacturera de Productos Quimicos was recently established in Mexico, D. F., for the manufacture of industrial chemicals. Although not working to capacity (2 metric tons daily) on aluminium sulphate, it nevertheless supplies practically the entire domestic requirements. On July 17, 1929, the Mexican Government accorded this industry greater protection by increasing the duty to 10 centavos per kilo.

# Scottish Chemical Market

*The following notes on the Scottish Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

*Glasgow, October 9, 1929.*

SINCE our last report, after the local holiday, business has been rather better. Export inquiry remains good, and there are no changes in price of any importance to record.

### Industrial Chemicals

ACETONE, B.G.S.—£76 10s. to £85 per ton, ex wharf, according to quantity. Inquiry remains satisfactory.

ACID ACETIC.—This material is still scarce for immediate supply, but prices remain unchanged as follows: 98/100% glacial, £56 to £67 per ton, according to quality and packing, c.i.f. U.K. ports; 80% pure, £37 10s. per ton, ex wharf; 80% technical, £37 10s. per ton, ex wharf.

ACID BORIC.—Crystals, granulated or small flakes, £30 per ton. Powder, £32 per ton, packed in bags, carriage paid U.K. stations. There are a few fairly cheap offers made from the Continent.

ACID CARBOLIC, ICE CRYSTALS.—Prompt delivery difficult to obtain and prices now quoted for early delivery round about 8d. per lb., delivered or f.o.b. U.K. ports.

ACID CITRIC, B.P. CRYSTALS.—Quoted 2s. 2d. per lb., less 5%, ex store, prompt delivery. Rather cheaper offers for early delivery from the Continent.

ACID HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy; dearsenicated quality, 5s. 6d. per carboy, ex works, full wagon loads.

ACID NITRIC, 80° QUALITY.—£24 10s. per ton, ex station, full truck loads.

ACID OXALIC, 98/100%.—On offer at about 3¼d. per lb., ex store. Offered from the Continent at 3¼d. per lb., ex wharf.

ACID SULPHURIC.—£2 15s. per ton ex works for 144° quality; £5 15s. per ton for 168°. Dearsenicated quality, 20s. per ton extra.

ACID TARTARIC, B.P. CRYSTALS.—Quoted 1s. 5d. per lb., less 5%, ex wharf. On offer for prompt delivery from the Continent at 1s. 4½d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE.—Quoted at round about £7 10s. per ton, ex store.

ALUM, LUMP POTASH.—Now quoted £8 7s. 6d. per ton, c.i.f. U.K. ports. Crystal meal about 2s. 6d. per ton less.

AMMONIA, ANHYDROUS.—Quoted 7½d. per lb., carriage paid. Containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton, powdered £38 per ton, packed in 5 cwt. casks, delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 880°.—Unchanged at about 2½d. to 3d. per lb., delivered according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £21 to £22 per ton, ex station. Fine white crystals offered from the Continent at about £17 5s. per ton, c.i.f. U.K. ports.

ANTIMONY OXIDE.—Spot material quoted £35 per ton, ex wharf. On offer for prompt shipment from China at £33 10s. per ton, c.i.f. U.K. ports.

ARSENIC, WHITE POWDERED.—Now quoted £18 per ton, ex wharf, prompt despatch from mines. Spot material still on offer at £19 15s. per ton, ex store.

BARIUM CHLORIDE.—In good demand and price about £11 per ton, c.i.f. U.K. ports.

BLEACHING POWDER.—British manufacturers' contract price to consumers unchanged at £6 12s. 6d. per ton, delivered in minimum 4-ton lots. Continental now offered at about the same figure.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price £4 5s. per ton to £4 15s. per ton, according to quantity and point of delivery. Continental material on offer at £3 12s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Unchanged at about £3 10s. per ton, f.o.r. works, or £4 12s. 6d. per ton f.o.b. U.K. ports.

FORMALDEHYDE, 40%.—Remains steady at about £36 10s. per ton, ex works.

GLAUBER SALTS.—English material quoted £4 10s. per ton, ex station. Continental on offer at about £3 5s. per ton, ex wharf.

LEAD, RED.—Price now £37 10s. per ton, delivered buyers' works.

LEAD, WHITE.—Quoted £37 10s. per ton, c.i.f. U.K. ports.

LEAD ACETATE.—White crystals quoted round about £39 to £40 per ton, ex wharf. Brown on offer at about £2 per ton less.

MAGNESITE, GROUND CALCINED.—Quoted £8 10s. per ton, ex store. In moderate demand.

METHYLATED SPIRIT.—Industrial quality 64 O.P. quoted 1s. 4d. per gallon less 2½% delivered.

POTASSIUM BICHROMATE.—Quoted 4⅜d. per lb. delivered U.K. or c.i.f. Irish ports, with an allowance of 2½% for minimum 2½ tons to be taken.

POTASSIUM CARBONATE.—Spot material on offer at £26 10s. per ton ex store. Offered from the Continent at £25 5s. per ton c.i.f. U.K. ports.

POTASSIUM CHLORATE, 99¾/100% POWDER.—Quoted £25 10s. per ton ex wharf. Crystals 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £19 2s. 6d. per ton c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton, ex store.

POTASSIUM PERMANGANATE B.P. CRYSTALS.—Quoted 5¼d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Spot material quoted 7d. per lb., ex store. Offered for prompt delivery from the Continent at about 6¾d. per lb. ex wharf.

SODA, CAUSTIC.—Powdered 98/99% £17 10s. per ton in drums. £18 15s. per ton in casks. Solid 76/77% £14 10s. per ton in drums, and 70/75% £14 2s. 6d. per ton in drums, all carriage paid buyers' stations, minimum 4-ton lots, for contracts 10s. per ton less.

SODIUM BICARBONATE.—Refined recrystallised £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3⅞d. per lb. delivered buyers' premises with concession for contracts.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station. Powdered or Pea quality 27s. 6d. per ton extra. Light soda ash £7 1s. 3d. per ton ex quay, minimum 4-ton lots with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £8 17s. 6d. per ton, ex station, minimum 4-ton lots. Pea crystals on offer at £14 15s. per ton, ex station, minimum 4-ton lots. Prices for this year unchanged.

SODIUM NITRATE.—Chilean producers are now offering at £9 9s. per ton, carriage paid buyers' sidings, minimum 6-ton lots, but demand in the meantime is small.

SODIUM PRUSSIATE.—Quoted 5¼d. per lb., ex store. On offer at 5d. per lb., ex wharf to come forward.

SODIUM SULPHATE (SALTCAKE).—Prices 50s. per ton, ex works, 52s. 6d. per ton, delivered for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption. Solid 60/62% £9 per ton. Broken 60/63% £10 per ton. Crystals 30/32% £7 2s. 6d. per ton delivered buyers' works on contract, minimum 4-ton lots. Special prices for some consumers. Spot material 5s. per ton extra.

SULPHUR.—Flowers, £12 per ton; roll, £10 10s. per ton; rock, £10 7s. 6d. per ton; ground American, £9 5s. per ton; ex store.

ZINC CHLORIDE, 98%.—British material now offered at round about £20 per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Quoted £10 per ton, ex wharf.

NOTE.—Please note that the above prices are for bulk business and are not to be taken as applicable to small quantities.

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### American Chemical Society and Chemical Warfare

AT the recent meeting of the American Chemical Society at Minneapolis, the council of the Society unanimously approved the following resolution:—

"Whereas, the name 'Chemical Warfare' is associated in the minds of many people with broken treaties and inhuman forms of warfare, and

"Whereas, this unreasoning feeling against the name 'Chemical Warfare' is difficult to combat, due to war-time propaganda against the German use of poison gas which has left a distorted picture in the public mind in regard to the use of chemical agents in warfare, and

"Whereas, the Chemical Warfare Service plays an extremely important part in our national defence and in our peace-time chemical research activities, a part which should be understood but not feared,

"Therefore, be it resolved that the American Chemical Society meeting in convention in Minneapolis, Minnesota, go strongly on record recommending that the word 'warfare' be eliminated from Chemical Warfare Service, and that the name of the service be the Chemical Corps, U.S. Army."

# Manchester Chemical Market

(From Our Own Correspondent.)

*Manchester, October 10, 1929.*

A fair volume of inquiry for chemicals has been reported on this market during the past week, but, for the most part, orders resulting have related to comparatively small parcels. Considering the unsatisfactory state of the Lancashire cotton trade, there is a fair demand for deliveries of textile chemicals against contracts. Price movements during the past week have been within relatively narrow limits and, on the whole, the market is in a reasonable stable condition.

### Heavy Chemicals

Quotations for chlorate of soda range from 2½d. per lb. upwards, according to quantity, with only a moderate business being transacted. There is a moderate inquiry about in the case of phosphate of soda, current offers of which are in the neighbourhood of £11 5s. per ton. Bicarbonate of soda is firm on a contract basis of £10 10s. per ton and a fairly steady trade is being put through. Caustic soda is moving in regular quantities with values at from £12 15s. to £14 per ton, according to quality. The tendency in the case of saltcake at the moment seems to be very firm and supplies are on a more restricted scale than they have been of late; to-day's prices are at £2 15s. to £3 per ton. The demand for sulphide of sodium is on quiet lines, but values show little alteration on the week, the 60–65 per cent. concentrated sold material being at round £9 per ton and the commercial grade at £8. Hypo-sulphide of soda is reasonably steady at £15 5s. to £15 10s. per ton for the photographic quality and about £9 for the commercial, with business on moderate lines. A moderate inquiry is reported in the case of alkali, offers of which are very firm at £6 per ton. With regard to prussiate of soda, a quietly steady demand is being experienced in this section and values are fully maintained at from 4¾d. to 5¼d. per lb., according to quantity. Bichromate of soda is moving off in fair quantities and prices are well held at about 3⅝d. per lb.

A moderate weight of business has been reported this week in respect of caustic potash, quotations for which keep steady at from £32 per ton upwards, according to quantity. The demand for permanganate of potash is still on a relatively quiet scale, although there has been little change in prices on the week, the B.P. quality being quoted at 5¼d. per lb. and the commercial kind at about 5d. Bichromate of potash meets with a quietly steady demand and current values range from about 4¼d. to 4½d. per lb. Chlorate of potash is still on the slow side, but prices are about maintained at 2¾d. per lb. Yellow prussiate of potash is a very firm section and a fair business is being put through; offers are at from 6¾d. to 7¼d. per lb., according to quantity. Carbonate of potash is rather steadier, with quotations at from £25 to £25 10s. per ton for the 96 per cent. material.

The demand for arsenic on this market during the past week has been on a comparatively quiet scale, and £16 5s. per ton at the mines, for white powdered Cornish makes, is about the top price to-day. There is only a moderate inquiry about in the case of sulphate of copper and values have shown some easiness, the present range being from £26 to £26 10s. per ton, f.o.b. Nitrate of lead is in quiet request at round £33 10s. per ton, with acetate about unchanged on the week at £39 per ton for the brown material and £39 10s. for the white. The acetates of lime meet with a moderate inquiry, the grey quality being on offer at £16 5s. per ton and the brown at £8.

### Acids and Tar Products

A steady trade is passing in acetic acid and prices are firm at round £66 per ton for the glacial and £36 for the 80 per cent. commercial quality. Oxalic acid is on the quiet side but values are held at about £1 13s. per cwt., ex store. There is only a moderate call for citric acid, offers of which are at 2s. 1d. to 2s. 1½d. per lb. With regard to tartaric acid, quotations are held at about 1s. 4½d. per lb. and a fair business is reported.

In the by-products section, pitch is firm at up to 47s. 6d. per ton, f.o.b., and a continued quiet demand for shipment is reported. Creosote oil keeps fairly steady at 3¼d. to 3¾d. per gallon, naked at works, with business on moderate lines. Carbolic acid is firm and in active demand at round 2s. 4d. per gallon for 60's crude and 9d. per lb. for crystals. Solvent naphtha meets with a fair amount of inquiry at 1s. 2½d. per gallon.

# Company News

Borax Consolidated.—A dividend has been declared at the rate of 6 per cent. per annum, less income tax, at 4s., on the preferred ordinary shares, in respect of the half-year ended September 30, 1929.

Imperial Chemical Industries, Ltd.—An interim dividend of 3 per cent. actual, less income tax at 4s. in the £, is announced payable on December 2. The terms of a circular to shareholders are summarised on another page.

Associated Dyers and Cleaners.—The directors have declared an interim dividend of 8d. per share, less tax, on ordinary shares, payable on October 31, 1929. Dividend on 6½ per cent. cumulative preference shares will also be paid on that date.

Glenboig Union Fire Clay.—Including £4,219 brought in, the balance of profit for year ended August 31, 1928, was £15,000. To depreciation is placed £1,000, to taxation reserve £1,500, and a dividend for the year of 7½ per cent., less tax, is recommended, leaving to be carried forward £4,000.

Santiago Nitrate Co. Ltd.—At an extraordinary general meeting held in London on Wednesday, a resolution providing for the voluntary winding-up of the company was carried unanimously, and Mr. W. J. Welch, of 27, Leadenhall Street, London, was appointed liquidator. The resolution is to be confirmed at an extraordinary general meeting on October 24.

Rio Tinto Co.—An interim dividend of 25s. per share, equal to 25 per cent., has been declared by the directors in respect of the year ending December 31 next. Last year the interim dividend was 15 per cent., followed by a final of 25 per cent., making a total distribution for 1928 of 40 per cent. The dividend now announced applies to the recently issued shares, as well as to the old shares. Payment will be made on November 1 next.

"B. and L." Powdered Fuel.—The report to March 31, 1929, states that the period under review has been devoted to the forwarding of the company's interests throughout the world and developing the Brand system of burning powdered fuel. The company has granted a licence for Great Britain and Northern Ireland to the Brand Powdered Fuel System, and negotiations are in hand with a view to dealing with the company's patents in other countries. The balance sheet shows patents and inventions (at cost), £41,695, Brand Powdered Fuel System 100,000 fully-paid ordinary shares of £1 each acquired on grant of licence, £100,000, debtors (since received), £15,111, cash at bank and in hand, £13,637, capital reserve, £105,500, creditors, £5,216; the balance sheet total is £185,716. The annual meeting will be held at St. Ermin's Hotel, Westminster, London, on October 16, at 11 a.m.

Solidol Chemical (France).—The report of progress since the date of incorporation states that after prolonged and difficult negotiations an agreement was reached, by which the company acquired the entire share capital of Société Française du Lysol. Assets thus acquired comprise Société's factory (at Ivry-sur-Seine, an industrial area near Paris), with surrounding freehold land and adjacent buildings, plant and machinery, furniture, fixtures and fittings, and all trade marks and goodwill. After dealing with arrangements for sale of products in Belgium and Germany, report goes on to state that delays have been experienced in introducing preparations into foreign markets, on account of local regulations concerning trade mark registration and conditions to be complied with in respect of pharmaceutical preparation. Current reports from various markets and inquiries from other countries for company's product indicate that an advance in business is imminent.

### Beryllium from Manitoba

The *Journal of Commerce* (Gardenvale, Quebec), reports the despatch to New York of 1,000 lbs. of beryl crystals, obtained from properties in Manitoba owned by Jack Nutt Mines, Ltd. The mineral outcrops in many places in the Lac du Bonnet area, of which much has been heard recently in connection with occurrences of tin ores. According to Mr. Jack Nutt, beryllium will be considered as a by-product of other mining operations, although large deposits appear to be available in the locality. The initial consignment is to be followed by others as soon as winter roads make possible the economic transportation of the mineral in car-lcad lots.

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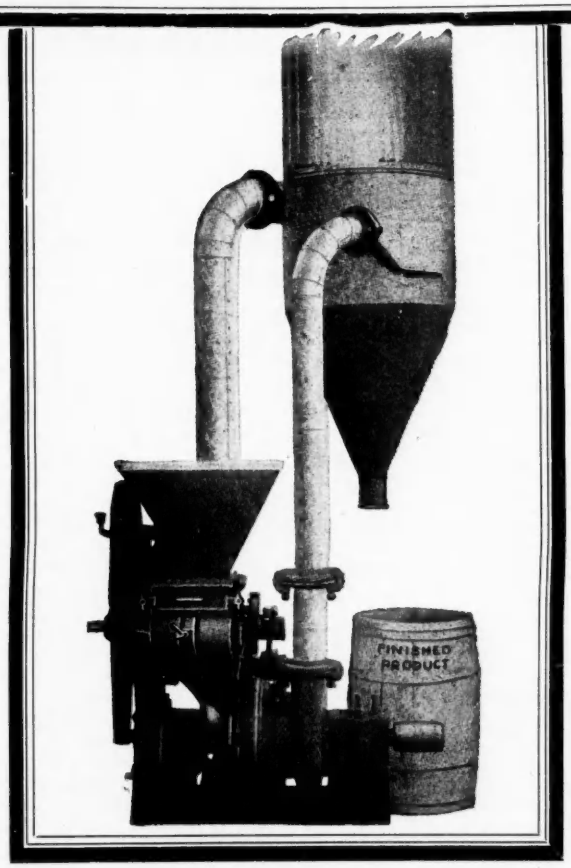


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# New Chemical Trade Marks

### Applications for Registration

*This list has been specially compiled for us from official sources by Gee and Co., Patent and Trade Mark Agents, Staple House, 51 and 52, Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks, and Designs.*

*Opposition to the Registration of the following Trade Marks can be lodged up to November 2, 1929.*

"DU-LUX."

503,989. Class 1. Chemical substances used in manufactures, photography or philosophical research, and anti-corrosives. Nobel Chemical Finishes, Ltd., Imperial Chemical House, Millbank, London; manufacturers. June 27, 1929.

*Opposition to the Registration of the following Trade Marks can be lodged up to November 9, 1929.*

SILVBRA.

503,834. Class 1. Lacquers for metals. F. Hulse and Co., Ltd., 26, Sholebroke View, Chapeltown, Leeds; manufacturers.—June 21, 1929.

REGENIT.

504,847. Class 1. Chemical substances for use in hardening and ennobling metals and alloys. Charles Rowley, 15, St. James's Place, London, S.W.1; consulting engineer.—July 27, 1929.

## Chemical Trade Inquiries

***The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.***

TARTAR EMETIC AND CARBON TETRACHLORIDE.—The Department of Public Health, Cairo, is calling for tenders, to be presented in Cairo by December 7, for the supply of 760 kilos of tartar emetic and 6,800 kilos of carbon tetrachloride. (Reference No. B.X. 5729.)

MEDICINAL OILS.—The Egyptian Department of Public Health is calling for tenders, to be presented in Cairo by December 7, for the supply of medicinal oils required during the year commencing May 1, 1930. (Reference B.X. 5731.)

DISINFECTANTS.—The Egyptian Department of Public Health is calling for tenders, to be presented in Cairo by December 7, for the supply of disinfectants for medical and general purposes required during the year ending April 30, 1931. (Reference B.X. 5730.)

### Rumoured Restriction of Chemical Warfare Research

A CORRESPONDENT of the *Manchester Guardian* writes as follows: "There are grounds for believing that any protagonists of chemical warfare there may be in this country are soon to meet a severe check. At present the possibilities of waging war by means of poison gas and bacilli—and of course the protective measures and antidotes—are being considered by a committee of representatives of the Admiralty, the War Office, and the Air Ministry, together with about a dozen eminent scientists and a large number of civilian associate members. The research and experimental work, on behalf of the three fighting services jointly, is carried out in the closely guarded enclosure at Porton, on Salisbury Plain, and in the much smaller branch establishment at Sutton Oak. If my information is correct, both of these centres are to be closed down entirely in the near future. This step, however, does not seem likely to have been decided on for any other reason than that of economy. Probably the researches will be continued, though on a reduced scale, in the existing naval and military stations, such as the base at Haslar, which are used for tests of various kinds."

# Commercial Intelligence

***The following are taken from printed reports, but we cannot be responsible for any errors that may occur.***

## County Court Judgments

*[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]*

CAMPHYLENE CO., LTD., Eckington Gardens, New Cross Gate, disinfectant manufacturers. (C.C., 12/10/29.) £14 4s. August 12.

ROBERTS OIL CO., LTD., 32, Victoria Street, S.W., oil merchants. (C.C., 12/10/29.) £17 10s. September 4.

## Mortgages and Charges

*[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case, the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

KENFORD, LTD., London, W.C., chemical manufacturers. (M., 12/10/29.) Registered September 26, £7,000 (not ex.) charge, to Bank; charged on Imperial Works, Balmoral Road, Watford. *Nil. August 20, 1928.

## London Gazette, &c.

### Company Winding Up Voluntarily

DERBY CHEMICALS, LTD. (C.W.U.V., 12/10/29.) By special resolution August 30th, confirmed September 21st. R. F. Gould, chartered accountant, 23, Wardwick, Derby, appointed as liquidator.

## New Companies Registered

AIR CONDITIONING UNITS, LTD., 5-6, Clements Inn, Strand, London, W.C.2. Registered October 7. Nominal capital, £1,200 in 1,140 5 per cent. cumulative preference shares of £1 each and 1,200 ordinary shares of 1s. each. To carry on the business of engineers, founders, smiths, machinists, manufacturers and patentees. Directors are: F. C. Andrew, P. J. Parvin.

HUTSPIN, LTD. Registered September 30. Nominal capital, £100 in 1s. shares. Objects:—To manufacture and deal in all classes of chemicals, and in particular to manufacture synthetic argent salts, etc. Directors: R. H. Spinney, "Milentro," Southchurch Avenue, Southend-on-Sea, and W. R. Hutchinson.

KENNEDY AND KEMPE, LTD., Harewood Forest, Longparish, Hants. Registered October 3. Nominal capital £2,500 in £1 shares. Iron, steel and non-ferrous metal smelters, refiners and founders, metallurgists, mechanical, chemical, electrical and marine engineers, etc. Directors: D. S. Kennedy and I. T. Kempe. Qualification: £50 shares.

KNOLL, LTD., 41, Great Tower Street, London, E.C.3.—Registered October 5. Nominal capital, £500 in £1 shares. Manufacturing chemists and druggists, manufacturers and vendors of drugs and chemicals, and agents for sale and supply of drugs, chemicals and pharmaceutical sundries, etc. Directors: W. Clemm, W. Bredt, H. R. Chatterton.

W. N. W. SYNDICATE, LTD., 229, Acton Lane, Acton.—Registered October 5. Nominal capital, £600 in £1 shares. To adopt an agreement with H. Wise, R. J. Neil and W. A. Ward, to carry on the manufacture of photographic emulsions, sensitive and non-sensitive; the coating and processing of various papers, raw and barytes; nitro-cellulose and acetyl-cellulose-base, etc. Directors: H. Wise, R. J. Neil, W. A. Ward.